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FINAL
Environmental Statement
EMERY
Units 3 and 4

MARCH 3, 1849

United States Department of the Interior — Bureau of Land Management

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United States Department of the Interior

BUREAU OF LAND MANAGEMENT
RICHFIELD DISTRICT OFFICE
150 East 900 North
Richfield, Utah 84701

October 15, 1979

Dear Reader:

Enclosed is a copy of the Final Emery Units 3 and 4 Environmental Statement.

This final environmental statement (FES) was modified and changed by using the comments received through the public review process on the draft environmental statement.

The final environmental statement is not the decision document. The decision on the action to be taken will be based on the analysis contained in the FES, public concerns and comments, and other multiple-use resource objectives or programs applicable on the area. No action can be taken for at least 30 days following filing of the final statement with the Environmental Protection Agency (10/11/79) and distribution to the public. A brief summary document that outlines the management direction for the actions that will be taken to authorize the proposal will be prepared and made available as soon as a decision is reached.

Thank you for the suggestions and comments you may have submitted on the draft. Your response has been valuable in the preparation of a final environmental statement which will assist us to more efficiently and effectively manage the public lands.

Sincerely yours,

Donald L. Pendelton

Donald L. Pendelton
District Manager

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FINAL
ENVIRONMENTAL STATEMENT

EMERY POWER PLANT
UNITS 3 & 4

Prepared by

BUREAU OF LAND MANAGEMENT
DEPARTMENT OF THE INTERIOR

Ed Hastey
Director, Bureau of Land Management

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SUMMARY

( ) Draft (X) Final Environmental Statement

Department of the Interior
Bureau of Land Management
Utah State Office

1. Type of action: (X) Administrative ( ) Legislative

2. Brief Description of Action: Utah Power and Light Company, Salt Lake City, Utah, has proposed to construct and operate two additional 430 megawatt coal-fired steam-electric generating units in Emery County, Utah. (Unit 1 is currently producing power and Unit 2, currently under construction, is scheduled to go on line in 1980.) One 345 kilovolt transmission line, 118 miles long and parallel to the existing line for Emery Unit 1, would deliver power to a substation near Camp Williams, approximately 15 miles south of Salt Lake City, Utah. Coal would be mined underground from the proposed Cottonwood portal of the existing Wilberg Mine and from the Deseret-Beehive Mines, conveyed and trucked to the plant. Water would be provided from the Cottonwood and Ferron Creek drainages.

3. Summary of Environmental Impacts and Adverse Environmental Effects:

The generating plant, mine, and support facilities, would occupy about 2,164 acres of land. The transmission line would require about 500 acres for right-of-way across federal lands.

The two units would emit 4.6 tons of particulates, 70 tons of nitrogen oxide, and 12.5 tons of sulfur dioxide per day using the poorest grade local coal. However, emission levels would be equal to or below the applicable air quality standards. Small amounts of radioactive elements and other trace elements would be released to the atmosphere. Stack emissions could also cause a reduction in visibility and could produce an evident yellow discoloration of the air.

Units 3 and 4 at the generating complex would consume a maximum of 14,000 acre-feet of water and about 2,500,000 tons of coal annually. Solid waste totaling 8,500,000 tons, covering 160 acres would be produced in the 35 year economic life of the two units.

Several archaeological and historical sites are along the proposed transmission route, but none of the sites currently located have been nominated or are eligible for nomination to the National Register of Historic Places.

The proposed project would create a direct and indirect peak employment of 1,680, and would permanently employ about 1,610 persons.

4. Alternatives Considered: Considered are power plant sites in the vicinity of Green River, Wellington, Nephi, Delta, all in Utah, and Soda Springs, Idaho; transmission line routes and design; water sources; alternative coal handling facilities; coal transportation; delay; no action; plant design and operating methods; and other energy sources.

5. Comments Will Be Requested From the Following: Attached is a list of federal, state, and nongovernment agencies with jurisdiction and expertise which will receive copies of the final statement.

6. Date Statement Made Available to the Environmental Protection Agency and the Public:

Draft: February 16, 1979
Final:

ATTACHMENT

Organizations to Receive a Copy of the Draft Statement

Federal

- Advisory Council on Historic Preservation
- Department of Agriculture
  - Forest Service
  - Soil Conservation Service
- Department of Commerce
  - National Oceanic and Atmospheric Administration
- Department of Defense
- Department of Energy
  - Bonneville Power Administration
  - Office of Energy Research
  - Office of Environment
- Department of Health, Education and Welfare
- Department of Housing and Urban Development
- Department of the Interior
  - Bureau of Indian Affairs
  - Bureau of Mines
  - Bureau of Reclamation
  - Fish and Wildlife Service
  - Geological Survey
  - Heritage Conservation and Recreation Service
  - National Park Service
  - Office of the Solicitor
  - Office of Surface Mining
- Department of Labor
  - Mine Health and Safety Administration
  - Occupational Safety and Health Administration
- Department of Transportation
  - Federal Aviation Administration
  - Federal Highway Administration
- Environmental Protection Agency
- Interstate Commerce Commission

State

- State of Utah
  - Utah State Agencies Clearing House (A-95)
  - c/o State Planning Coordinator

Local

- Board of County Commissioners
  - Carbon, Emery, Garfield, Salt Lake, Sanpete, Sevier, Utah, Millard, Piute, Juab all in Utah; and Caribou in Idaho

ATTACHMENT (Continued)

Mayors of Castle Dale, Emery, Escalante, Ferron, Helper, Huntington, Orangeville, Price, Provo, Richfield, Escalante, Marysvale, Delta, Nephi, all in Utah; and Soda Springs and Bancroft, Idaho.
Six County Commissioners Organization
Southeastern Association of Governments

Nongovernmental Organizations

Archaeological Society of Utah
Canyon County Coalition
Chamber of Commerce (Carbon County)
Chamber of Commerce (Salt Lake Area)
Common Cause
Council on Utah Resources
Defenders of the Outdoor Heritage
Defenders of Wildlife
Desert Protective Council
Enchanted Wilderness Association
Environmental Defense Fund, Rocky Mountain/Great Plains
Escalante Wilderness Committee
Friends of the Earth
Good Earth
Izaak Walton League - Utah Division
ISSUE
League of Women Voters
Mearns Wildlife Society
Mineralogical Society of Utah
National Parks and Recreation Association
National Resources Defense Council, Inc.
National Wildlife Federation
Nature Conservancy
Rocky Mountain Center on Environment
Rocky Mountain Federation of Mineralogical Societies
Rocky Mountain Sportsmen Association
Save Our Canyons Committee
Sierra Club
Society of Conservation of Bighorn Sheep
Utah Audubon Society
Utah Cattlemen's Association
Utah CLEAR
Utah Environment Center
Utah Farm Bureau
Utah Geological and Mineral Survey
Utah Lung Association
Utah Mining Association
Utah Nature Study Society
Utah Sportsmen Association
Utah Water Users Association
Utah Wildlife and Outdoor Recreation Federation
Utah Wool Growers Association

ATTACHMENT (Concluded)

- Wasatch Mountain Club
- Western Rockhound Association
- The Wilderness Society
- Women's Conservation Council of Utah

Private Companies, Universities

- American Coal Company
- Brigham Young University
- College of Eastern Utah
- Intermountain Consumers Power Association
- University of Utah
- Utah Power & Light Company
- Utah State University

FOREWORD

This Draft Environmental Statement was prepared to comply with the National Environmental Policy Act of 1969, Public Law 91-190. It presents a disclosure of environmental impacts associated with governmental actions needed to authorize the applicant's proposal.

The Department of the Interior has designated the Bureau of Land Management as the lead agency responsible for this statement. For its preparation, the Bureau of Land Management established an interdisciplinary team which, in consultation with government agencies and recognized experts, identifed issues of concern. The U.S. Forest Service, U.S. Geological Survey, and Utah Division of Wildlife Resources provided team members. The team made an extensive review of the proposal and alternatives for the power plant, transmission lines, coal transportation systems, fuel sources, and water sources.

Expected environmental impacts, mitigating measures, adverse impacts which cannot be avoided, and alternatives to the proposal have been defined and analyzed. This statement will provide federal, state, and local governmental agencies with a comprehensive basis for analysis and decision-making.

This proposal consists of constructing two additional generating units adjacent to two under construction at the Emery power plant site in Emery County, Utah. On October 4, 1978, at the formal dedication of Unit 1, the power plant was renamed the "E. Allen Hunter Power Plant." A Final Environmental Statement (FES) for the first two units, entitled _Emery_, was made available by the Department of Interior to the Council on Environmental Quality and the public on March 15, 1977. Much of the information from the _Emery_ FES has been used in this document; however, most of the citations give reference to the original source rather than the FES itself. For the sake of clarity and continuity, this statement is called the "Emery Power Plant: Units 3 and 4." Units 3 and 4 were not analyzed in the _Emery_ FES because Utah Power and Light Company's plans did not include the additional units at that time.

Utah Power and Light Company provided data and description for the proposal and alternatives.

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CHAPTER 1

DESCRIPTION OF THE PROPOSAL

CHAPTER 1

DESCRIPTION OF THE PROPOSAL

INTRODUCTION

The Utah Power and Light Company (UP&L) proposes to build two additional coal-fired steam electric generating units adjacent to two units now under construction at their complex south of Castle Dale, Utah. Figure 1-1 shows the location of the Emery generating complex and Figure 1-2 shows the site as it appeared in June, 1978.

Upon completion, the entire complex would consist of four, 430 megawatt (MW) rated units and ancillary facilities. During normal full-load operation, each unit would produce a net output of 400 MW. The four units would have an economic life of 35 years and coal consumption would be approximately 4,880,000 tons of coal annually.

An additional power transmission line would share a corridor in common with the transmission line now installed for the first two units. Proposed water and coal sources would be different from those for the first two units. Figure 1-3 shows the proposed locations of the project's components.

Many of the facilities for Units 1 and 2 would also be used for Units 3 and 4. These include, among others, the administration building, warehouses, switchyard, coal storage and conveyors, parking lot, service roads, utilities, fuel oil storage, and fencing.

Table 1-1 is a summary of the proposal's major resource requirements. To show cumulative requirements, the quantities required for all four units are compared to the quantities for the two newly proposed units. Table 1-2 shows a similar comparison of solid waste production and air pollutant discharge.

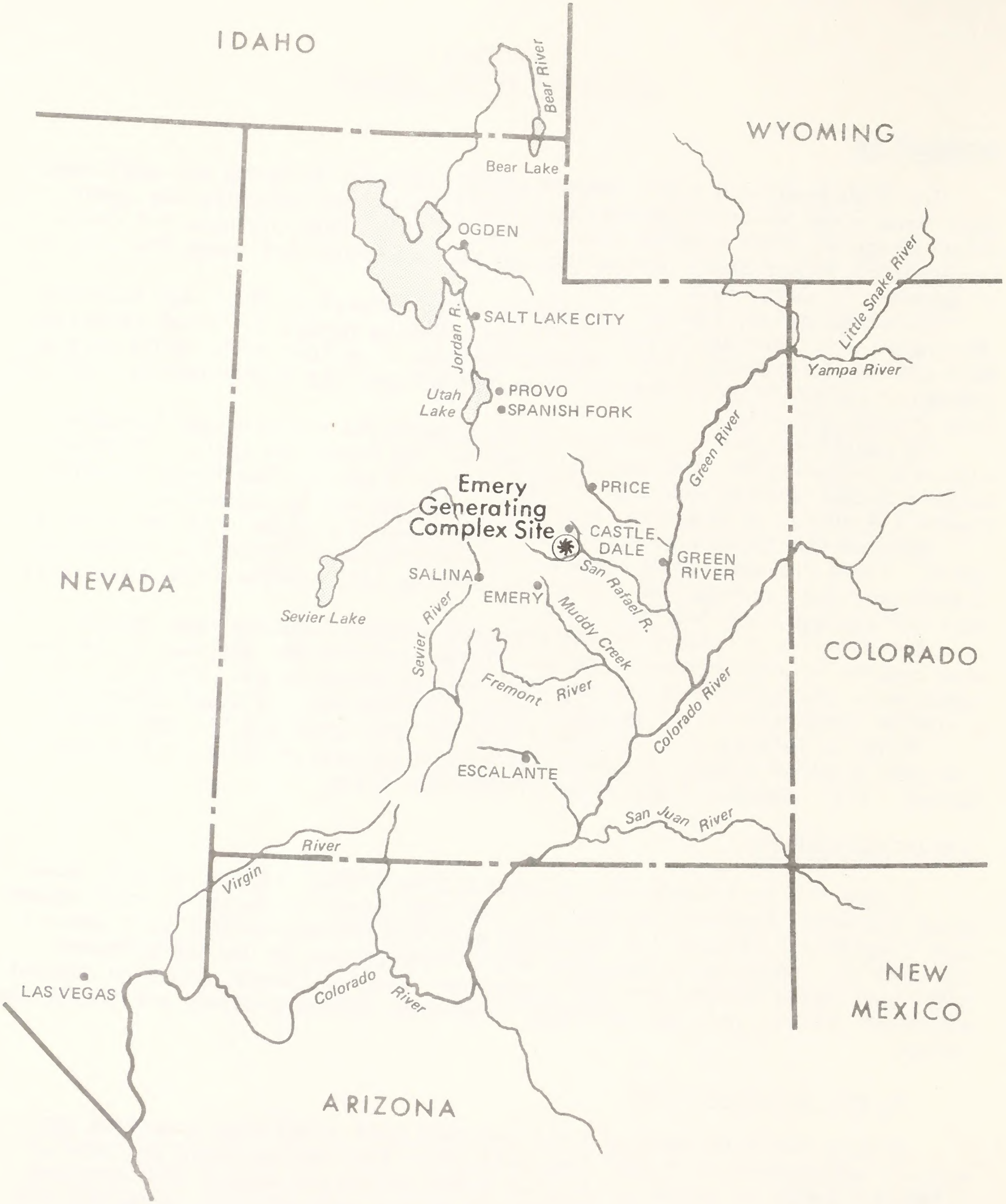
Prior to selection of the Emery site in 1977, UP&L and its consultants analyzed 15 other sites. A summary of site selection criteria is included in Appendix I-1. Chapter 8 discusses alternative sites.

GENERATING COMPLEX

Figure 1-4 is a comparison of artist's renderings of the two unit power block now under construction and the four unit power block, as it would appear upon completion. Figure 1-5 shows the plan for the entire four unit generating complex. Major new components and considerations of the two proposed additional units are boilers and generators, cooling towers, emission control equipment, reservoirs, coal storage, limestone, culinary water, and health and safety.

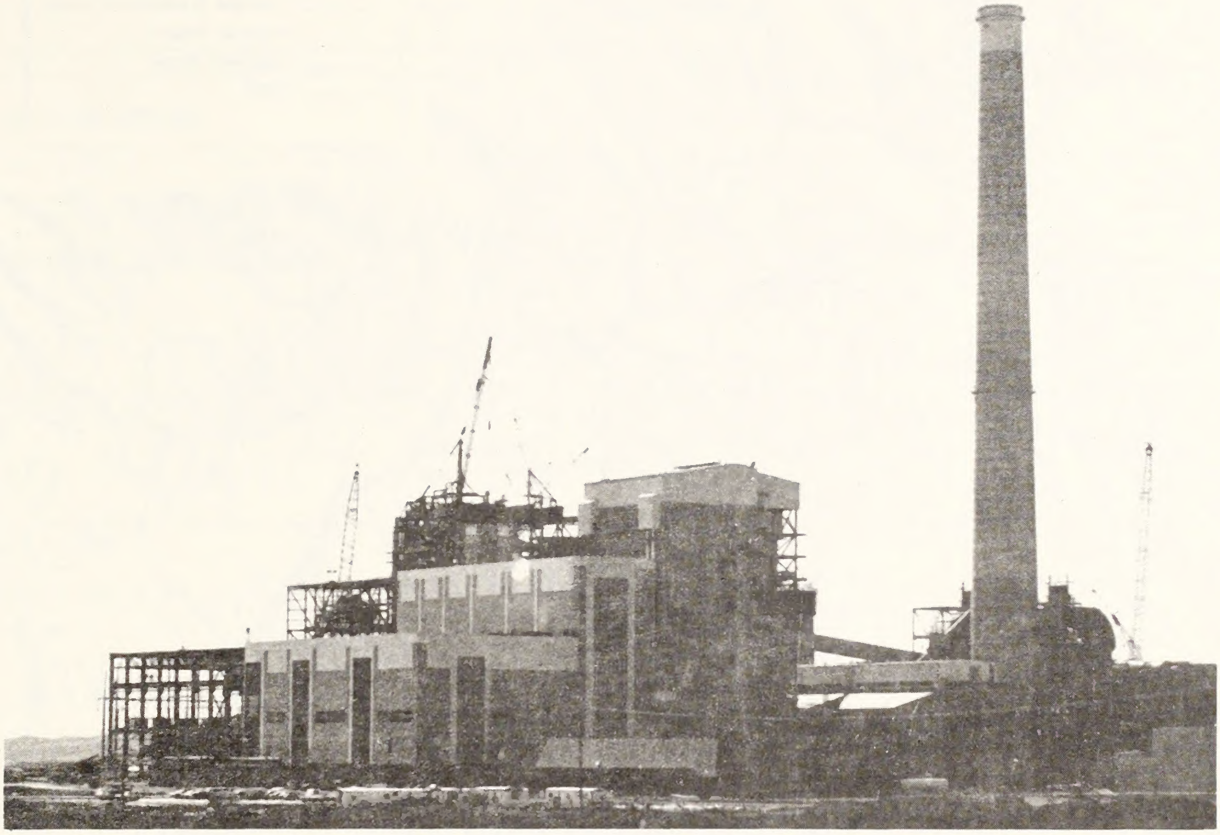
Boilers and Generators

Boilers would be opposed front and rear wall fired with a maximum combustion temperature of 2,600° Farenheit (F). Each boiler would be rated at 3,344,000 pounds of steam per hour at 2,400 pounds per square inch pressure and 1,000° F for both main steam and hot reheat temperatures. Annually, the two boilers would consume about 2,480,000 tons of coal and produce about 273,000 tons of ash operating at 80 percent of maximum continuous rating. Each generator would be rated at a gross maximum output of 430 MW at 22,000 volts.



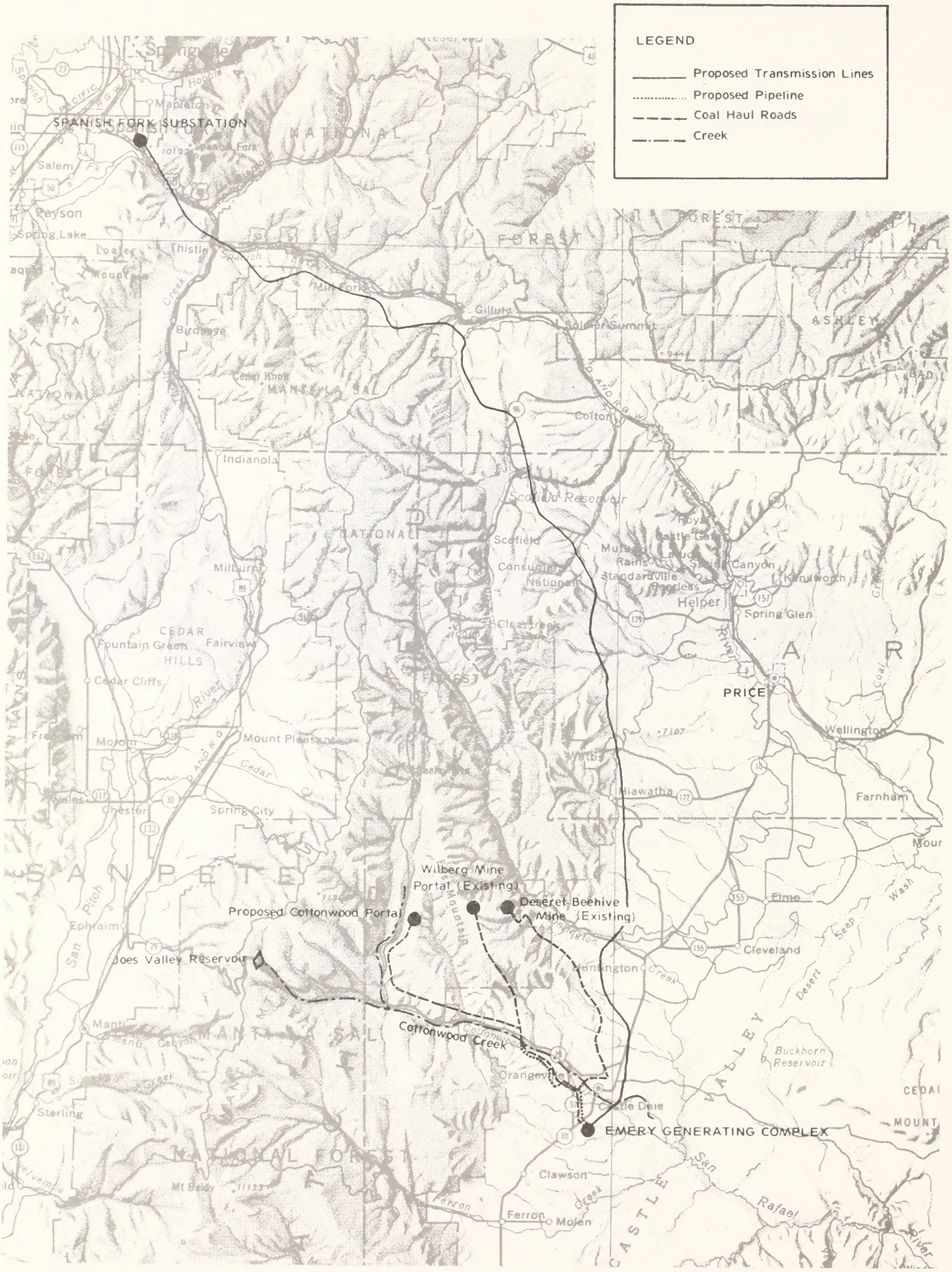
SITE LOCATION

FIGURE 1-1



EMERY PLANT IN JUNE OF 1978

FIGURE 1-2



PROPOSAL COMPONENTS

FIGURE 1-3

TABLE 1-1

Major Resource Requirements

	Land	Coal	Water	People
Generating Complex				
Units 3 and 4	Would be within the same 2,000 acre site already dedicated to Units 1 and 2.	70,000,000[a] tons burned during projected 35-year plant life.	14,000 acre-ft/yr for total plant usage. Three reservoirs to occupy 124 acres. Total capacity 2,414 acre-ft.	1,225 at peak direct employment in 1982. Operating employees would level off at 146 in 1985.
Units 1 through 4	Approx. 2,000 acres in generating complex.	140,000,000 tons burned during projected 35-year plant life.	28,000 acre-ft/yr for plant usage. Ten reservoirs and ponds to occupy 191 acres. Total capacity 3,118 acre-ft.	1,680 at peak direct employment in 1985. Operating employees would level off at 349 in 1985.
Coal Source				
Units 3 and 4	70 acres disturbed and occupied.	50,000,000[a] tons from the Cottonwood Portal of the Wilberg and Deseret-Beehive Mines, 20,000,000 tons from commercial source.	8 acre-ft/yr culinary water required.	275 miners at the Cottonwood Portal of the Wilberg Mine and 125 at the Deseret-Beehive Mines.
Units 1 through 4	164 acres disturbed and occupied.	120,000,000 tons from Wilberg and Deseret-Beehive Mines. 20,000,000 tons from commercial source.	25.6 acre-ft/yr culinary water required.	Miners would level off at 1,100 in 1985.
Transmission System				
Units 3 and 4	118 miles of new transmission line; 1,292 acres needed for right-of-way. (36 miles would be placed on existing double circuit towers.)	----	----	140 at peak construction employment in 1982.
Units 1 through 4	381 miles of transmission line; 5,961 acres needed for right-of-way.	----	----	----

Continued

Table 1-1 (concluded)

	Land	Coal	Water	People
Haul Roads				
Units 3 and 4	20.4 miles from mines to plant. 1.1 miles new construction (6.67 acres).	----	----	42 truck drivers, maintenance, and other personnel needed.
Units 1 through 4	25.9 miles from mines to plant. 1.1 miles new construction (6.67 acres).	----	----	88 truck drivers, maintenance, and other personnel needed.
Water Pipe Line				
Units 3 and 4	8.2 miles underground, 75 acres disturbed, 50 acres needed for right-of-way	----	----	45 workers at peak of construction.
Units 1 through 4	27.4 miles underground. 108 acres disturbed. 83 acres needed for right-of-way. Eight miles of pipeline in haul road right-of-way.	----	----	----

---

[a] Use of 70,000,000 tons of coal assumes a 65 percent operating capacity for the entire 35 years. During some years, as high as 85 percent operating capacity would be expected.

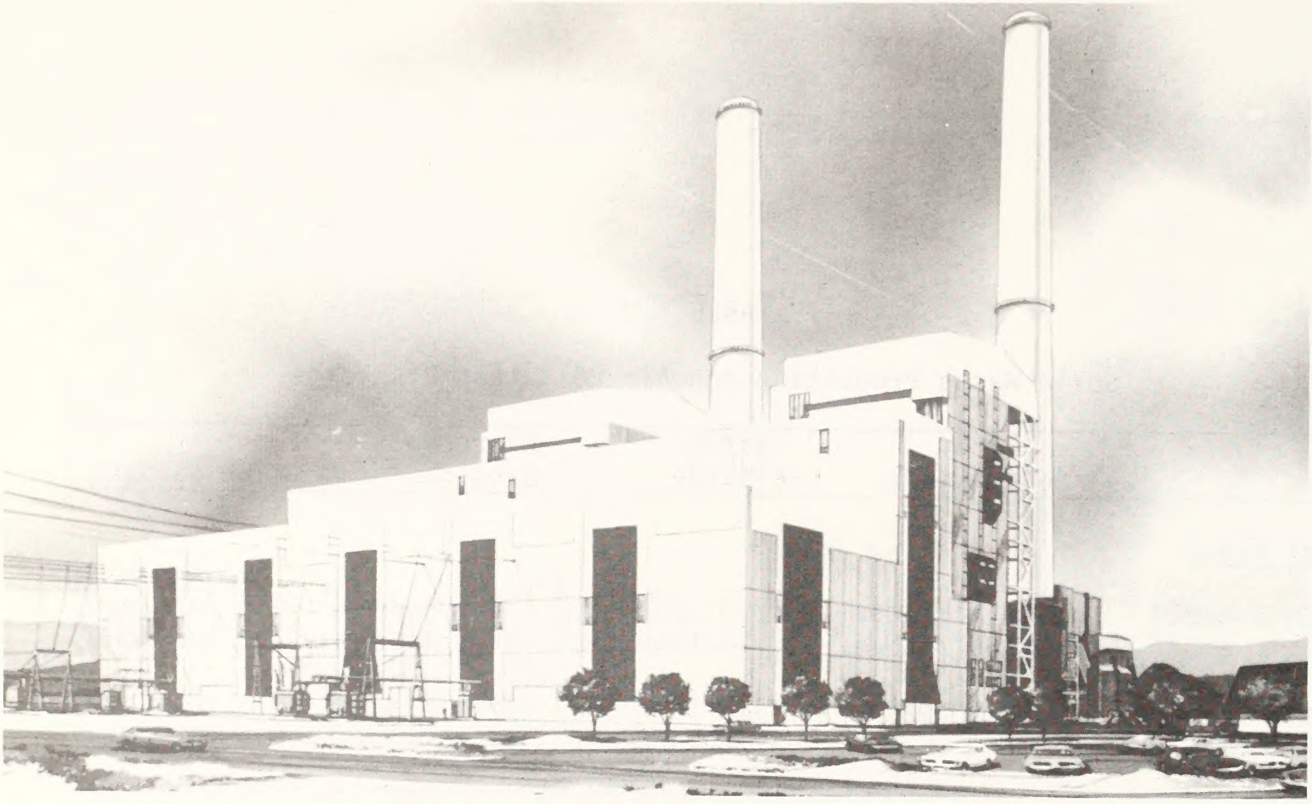
TABLE 1-2

Solid Waste Production and Air Pollutant Discharge

	Solid Waste	Sulfur Dioxide	Nitrogen Dioxide	Particulate
Power Plant				
Units 3 and 4	1,020 tons/day ash and sludge	12.5 tons/day[a] 7.6 tons/day[b]	70 tons/day[a] 57 tons/day[b]	4.6 tons/day[a] 3.0 tons/day[b]
Units 1 through 4	1,990 tons/day ash and sludge	37.5 tons/day[a] 22.8 tons/day[b]	140 tons/day[a] 144 tons/day[b]	9.3 tons/day[a] 6.0 tons/day[b]

[a] Assumes 100 percent output using poorest local grade coal for all units, 99.5 percent particulate control, and 90 percent SO_2 control for Units 3 and 4, and 99.5 percent particulate control and 80 percent SO_2 control for Units 1 and 2.

[b] Assumes 80 percent of full load using average local grade coal for all units, 99.5 percent particulate control, and 90 percent SO_o control for Units 3 and 4, and 99.5 percent particulate control and 80 percent SO_2 control for Units 1 and 2.

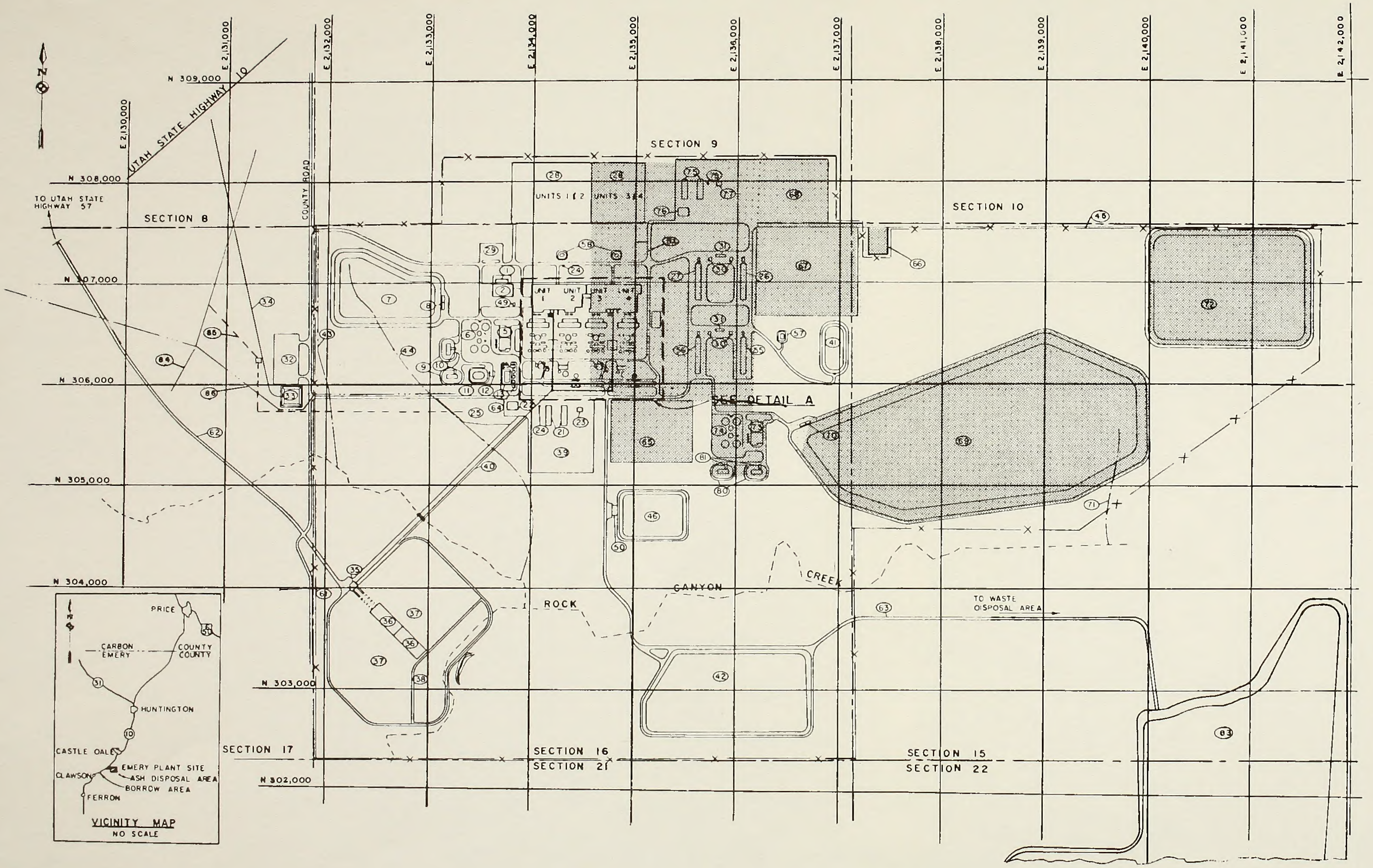


ARTIST'S SKETCH OF TWO UNIT COMPLEX

ARTIST'S SKETCH OF FOUR UNIT COMPLEX

COMPARISON OF TWO AND FOUR UNITS

FIGURE 1-4



LEGEND

COMMON ITEMS APPLICABLE TO GENERATING UNITS 1, 2, 3, 4

1 - Administration Building
11 - Polishing Pond
12 - Sewage Treatment Building
13 - Fuel Oil and Lube Oil Area
29 - Administration Parking
32 - Batch Plant
33 - Batch Water Pond
34 - Batch Water Pond Supply Pipeline
35 - Coal Receiving Building
36 - Coal Live Storage
37 - Coal Dead Storage
38 - Coal Yard Evaporation Pond
40 - Reclaim Coal Conveyor
41 - Circulating Water Holding Basin
43 - Dewatering Pipeline No. 1
45 - Security Fence
46 - Cooling Tower Blowdown Basin
49 - Paint Shop
50 - Recovery Basin
57 - Cooling Tower Chem. Trtm't. Evap. Pond
61 - Overland Coal Conveyor
62 - Coal Haul Road
63 - Ash Haul Road
64 - Fuel Tanks
69 - Raw Water Storage
70 - Raw Water Pump Building
71 - Dewatering Pipeline
83 - Solid Waste Disposal Area
84 - 69 kV Transmission Line
85 - Power Line
86 - Telephone Line

ITEMS APPLICABLE TO GENERATING UNITS 1 AND 2 ONLY

2 - Warehouse and Shop
3 - Precipitator (2 ea.)
4 - Chimney (2 ea.)
5 - Water Treatment Building
6 - Lime Softeners
7 - Raw Water Basin
8 - Raw Water Pump Building
9 - Clear Well (2 ea.)
10 - Clear Well Pump Station (2ea.)
14 - Fly Ash Silos (2 ea.)
15 - Dewatering Bins (2 ea.)
16 - Settling Tank
17 - Surge Tank
18 - Ash Water Storage Tank
19 - Ash Water Pumphouse
20 - Coal Transfer House
21 - Construction Warehouses
22 - Construction Office
23 - Vehicle Maintenance Building
24 - Sanitary Facility
25 - Construction Parking
26 - Cooling Tower, Unit No. 1
27 - Cooling Tower, Unit No. 2
28 - Switchyard
30 - Cooling Tower Control Building (2 ea.)
31 - Chemical Treatment
39 - Laydown Area
42 - Evaporation Basin
44 - Dewatering Pipeline No. 2
47 - Condensate Storage Tanks
48 - Remote Switchgear Building
51 - F.D. Fans (2 per unit)
52 - I.D. Fans (2 per unit)
58 - Deluge Pond
59 - Scrubber and Auxiliary Equipment (2 ea.)

ITEMS APPLICABLE TO GENERATING UNITS 3 AND 4

3 - Precipitator (2 ea.)
4 - Chimney (2 ea.)
14 - Fly Ash Silos (2 ea.)
15 - Dewatering Bins (2 ea.)
16 - Settling Tank
17 - Surge Tank
18 - Ash Water Storage Tank
19 - Ash Water Pump House
23 - Switchyard
30 - Cooling Tower Control Building (2 ea.)
31 - Chemical Treatment
47 - Condensate Storage Tanks
48 - Remote Switchgear Building
51 - F.D. Fans (2 per unit)
52 - I.D. Fans (2 per unit)
55 - Cooling Tower, Unit No. 3
56 - Cooling Tower, Unit No. 4
58 - Deluge Pond
59 - Scrubber and Auxiliary Equipment (2 ea.)
60 - Coal Transfer House No. 2
65 - Laydown Area
66 - Construction Parking
67 - Laydown Area
68 - Construction Area
72 - Evaporation Basin
73 - Water Treatment Building
74 - Lime Softeners
75 - Construction Warehouse (2)
76 - Construction Office
77 - Vehicle Maintenance Building
78 - Sanitary Facility
79 - Warehouse and Shop
80 - Clearwell (2 ea.)
81 - Clearwell Pump Station (2 ea.)
82 - Maintenance Parking

GENERATING COMPLEX PLAN

FIGURE 1-5

Cooling Towers

One wet, mechanical-draft, cross-flow, cooling tower would be provided for each of the two additional units and would resemble those installed for Units 1 and 2 as shown on Figure 1-6. Most cooling system water loss would be through evaporation at the cooling towers, which leaves behind most of the impurities originally in the water. Present design would recycle the water until the concentration of total dissolved solids is 15 times that in the original water. About 28 gallons of water per minute would be lost from Units 3 and 4 cooling towers as drift.

Emission Control Equipment

Each generating unit would be equipped with an electrostatic precipitator designed to remove 99.5 percent of the fly ash and a wet lime sulfur dioxide removal system (scrubbers) designed to remove 90 percent of the SO_2 from the flue gas. Some trace elements and additional particulates would also be removed by the scrubber system. The emission of nitrogen oxides (NOx) would be controlled by burner and boiler design. Boilers would produce less than 0.7 lbs. of NOx per million British thermal units (Btu) of heat input.

Each generating unit would require one unpainted, concrete smokestack approximately 600 feet tall. A summary of estimated stack emissions based on two units operating at maximum sustained capacity is shown in Table 1-3.

Reservoirs

Three additional lined reservoirs would be constructed within the existing generating complex site. Reservoirs are listed on Table 1-4. Total surface area would be about 124 acres.

Coal Storage and on Site Delivery

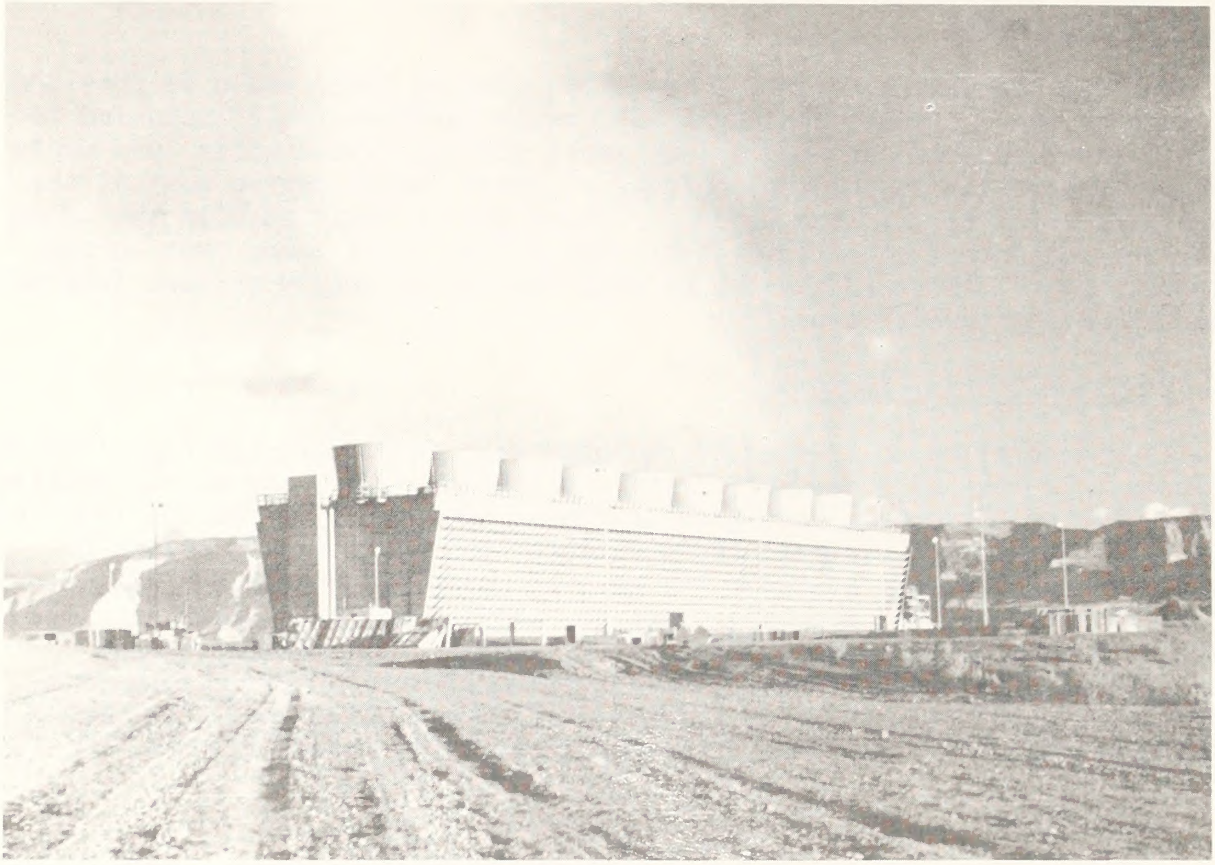
Upon delivery at the receiving building, coal would be dumped adjacent to the covered live storage area. The coal would then be pushed to either "live" or "dead" area by rubber tired dozers. The live storage area for Units 1 and 2 would be increased to hold an additional 72,000 tons of coal, enough for 10 days normal use. An additional 630,000 tons of coal in dead storage would be enough for 90 days normal use in case of machinery breakdown, mine disaster, or coal miners strike. Dead storage coal would be tightly compacted to control spontaneous combustion and piles would not be covered. Coal in live storage would be covered by an extension of the cover built for Units 1 and 2 as shown on Figure 1-7.

Water runoff from coal storage areas would drain to the coal yard evaporation pond.

A conveyor is already built at the plant site to carry coal from storage to the generating facilities.

Limestone

About 17,725 tons of lime per year would be needed in the SO_2 scrubbers and for water treatment. This would require annual production of 35,450 tons of limestone. Sierra Chemicals Company, headquartered in Reno, Nevada, has already contracted to furnish lime. The company would reopen a limestone kiln and refine the limestone near Panaca, Nevada. The operation would employ about 20 persons.



COOLING TOWERS INSTALLED FOR UNIT 1

FIGURE 1-6

TABLE 1-3

Estimated Stack Emissions
Average Coal

Constituent	Weight (tons/day)
CO_2 (carbon dioxide)	13,680
H_2O (water)	2,865
N_2 (molecular nitrogen)	52,520
O_2 (molecular oxygen)	2,357
SOx (oxides of sulfur) as SO_2	7.63
NOx (oxides of nitrogen) as NO_2	56.4
Ash (with 99.5 percent efficient electrostatic precipitator)	3.0

Source: Utah Power and Light.

Note: Anticipated flue gas analysis is based on two boilers, 860 MW gross output at maximum sustained operating capacity (80 percent of maximum continuous rating), coal firing rate of 367 tons per hour, or 8,815 tons per day, flue gas flow of 2,200,000 standard cubic feet per minute and Wilberg coal. Emissions for SO_2 are based on having 90 percent SO_2 control. The company submitted this emission data to EPA as part of a request for a Prevention of Significant Deterioration (PSD) permit (February 27, 1978).

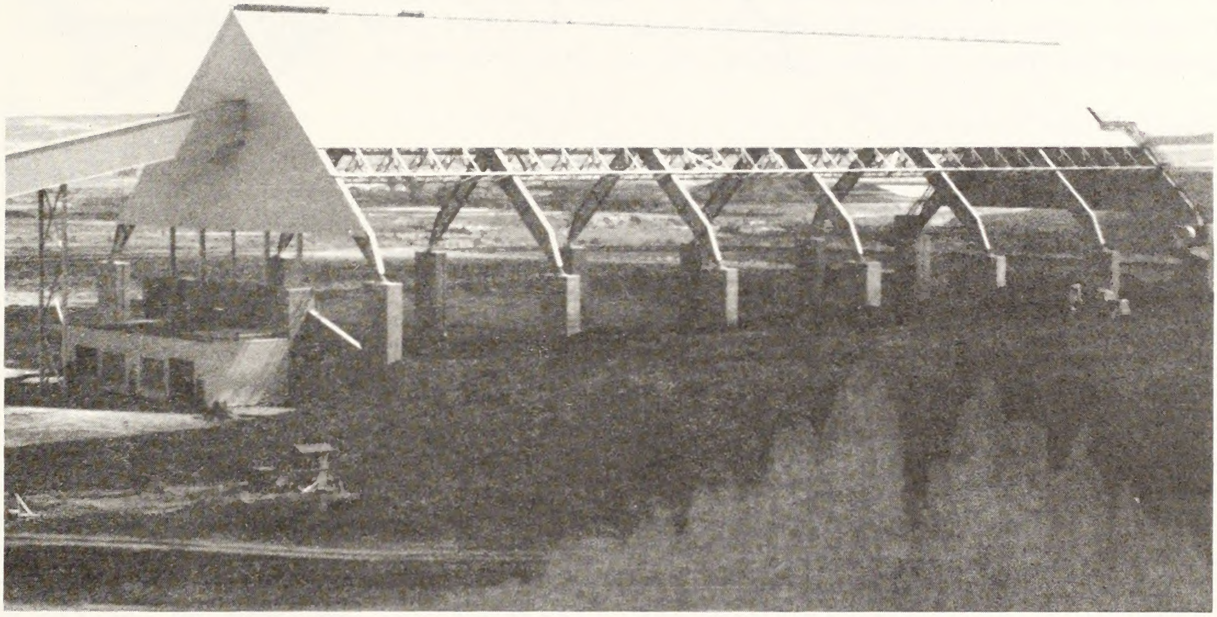
TABLE 1-4

Reservoirs Required for Emery 3 and 4

	Ponds		
Description	Raw Water Reservoir[a]	Evaporation Basin	Clear Well
Size (acre)	83.0	40.0	1.4
Capacity (acre-feet)	2,000	400	14
Lining	Impervious Clays	Impervious Clays	Concrete
Dike Height (feet)	43	8	Flush w/ground
Purpose	To store "make up" water at the plant site.	To hold waste water until evaporation.	To hold treated water prior to use.
Dike Material (cubic yards)	863,000 taken from pond area	400,000 taken from pond area	Concrete tank

Source: Utah Power and Light.

[a] The Utah State Engineer has already issued a permit for construction of the raw water reservoir.



COAL STORAGE FOR UNITS 1 AND 2

FIGURE 1-7

Lime would be trucked (by 27-ton capacity trucks) approximately 290 miles from the mine to the site, via Cedar City and Salina, Utah.

Culinary Water

Potable water is being supplied from the Castle Dale water system to Units 1 and 2. This system would also supply the needs of Units 3 and 4. An additional 7,200 gallons per day or 8 acre-feet per year would be needed at the generating station upon completion of Units 3 and 4.

Health and Safety

Health and safety measures would comply with Occupational Safety and Health Administration (OSHA) regulations. White strobe lights would be installed on the smokestacks for aircraft warning.

COAL SUPPLY

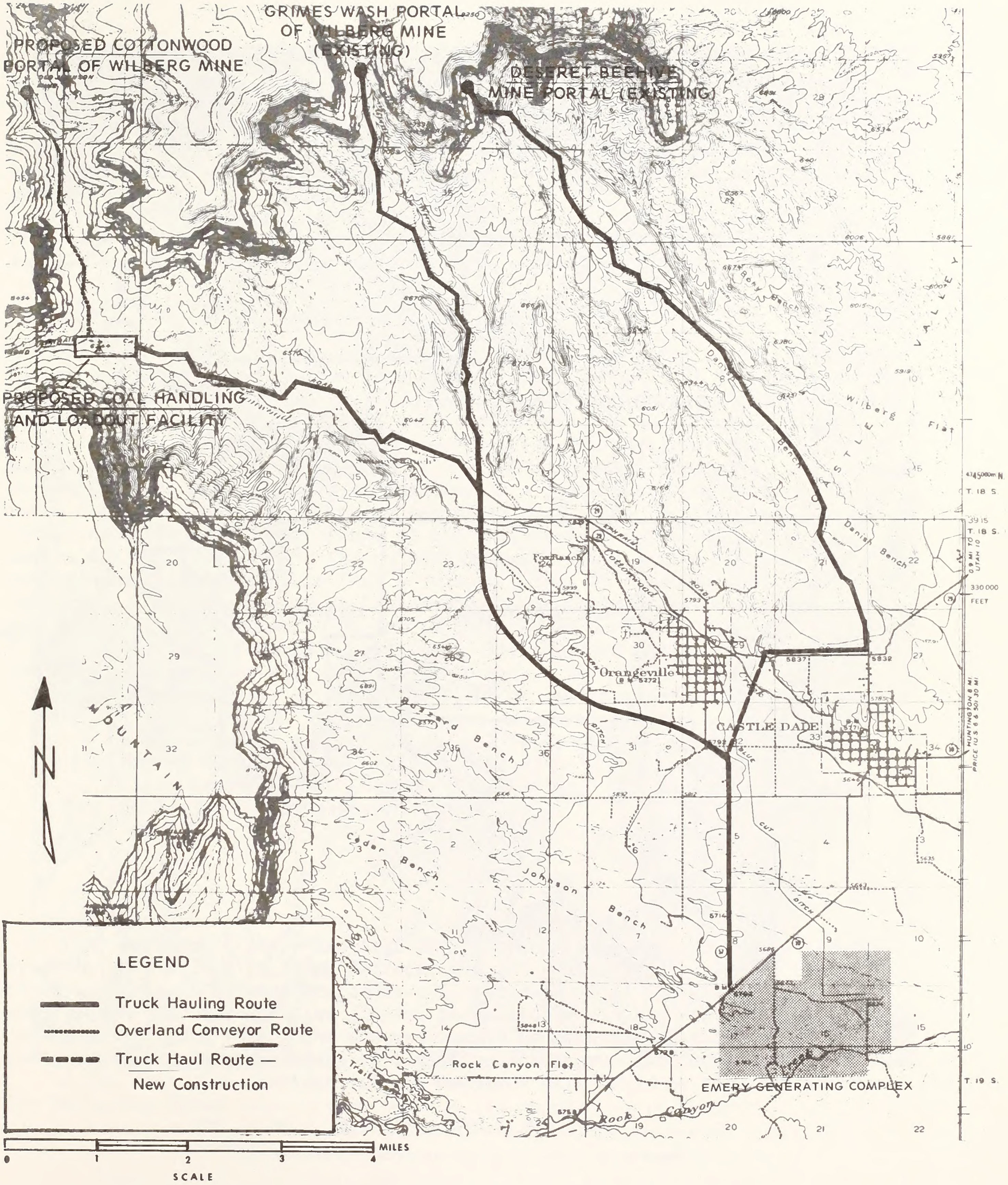
UP&L proposes to provide most of the fuel for Units 3 and 4 through expansion of existing facilities and construction of some new transportation systems. Figure 1-8 shows the location of new development and the proposed transportation system.

At a maximum load factor of 80 percent, Emery Units 3 and 4 would require 2.5 million tons of coal annually and 86.8 million tons over the 35-year plant life. However, UP&L has historically operated their plants at an average 65 percent load over the life of the plant. Lifetime coal consumption, at the 65 percent level, would be about 70 million tons for Units 3 and 4.

About 70 percent (50 million tons) of the fuel for the two new units would come from company owned and leased federal coal lands near Huntington, Utah, shown on Figure 1-9. It is proposed to expand the existing Wilberg Mine, now operating out of the Grimes Wash portal, by developing the new Cottonwood Portal to produce 1.5 million tons of coal annually. In addition, the existing Deseret-Beehive Mines (Church Mines) would provide approximately 1.0 million tons of current production annually to the Emery units. About 1 mile of new road would be constructed over the private land to route coal trucks around the towns of Castle Dale and Orangeville.

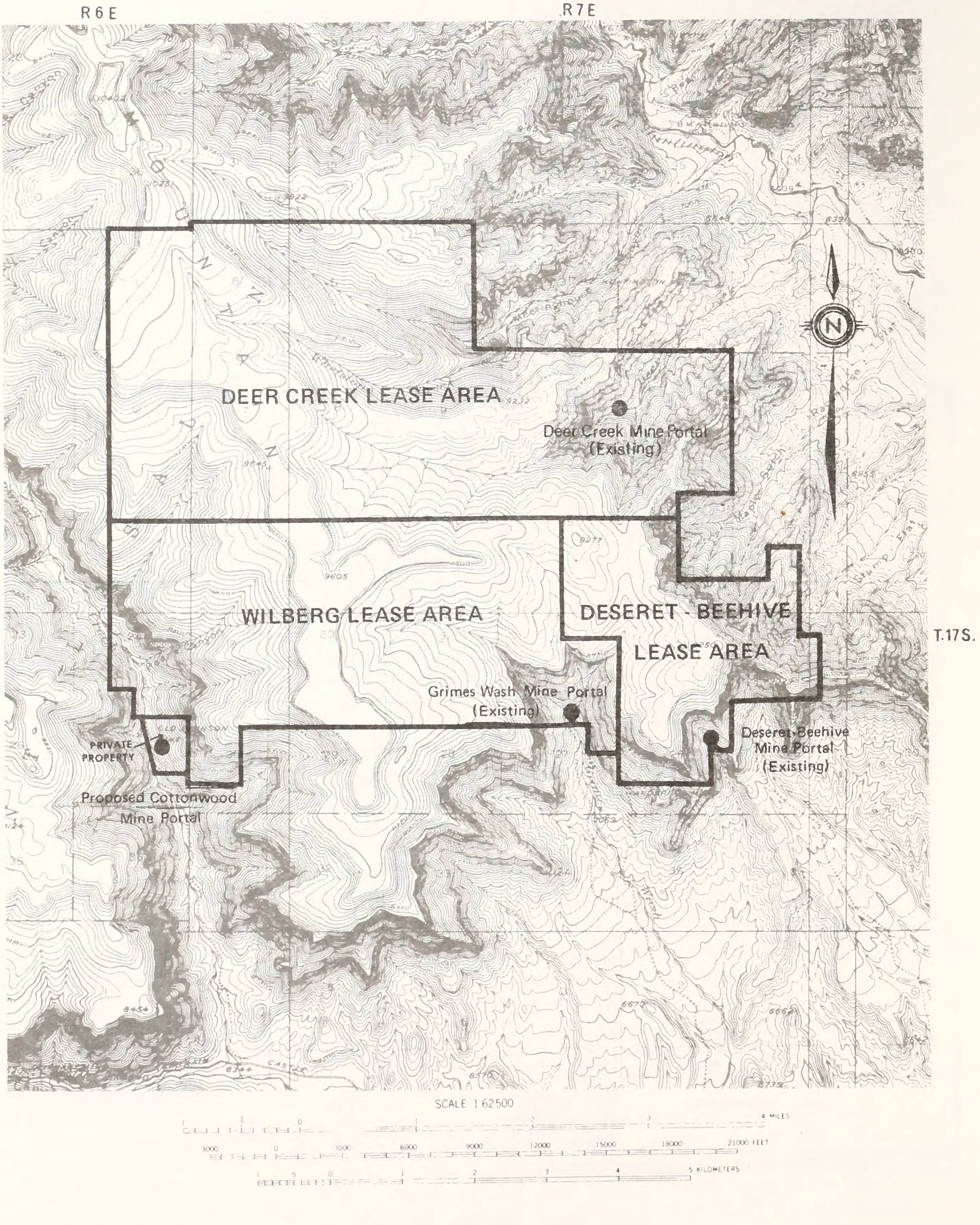
Mining and reclamation plans have not been prepared for the proposed Cottonwood portal because this proposal was submitted prior to the implementation of regulations under sections 502 and 523 of the Surface Mining Control and Reclamation Act of 1977 (P.L. 95-87). However, in this statement the applicable regulations are considered as a required federal mitigating measure. As soon as the regulations are finalized and the mining and reclamation plans are prepared, the U.S. Geological Survey (USGS) and the Office of Surface Mining (OSM) would review the plans to determine compliance with the regulations.

Currently operated company-owned mines are extracting coal by the room and pillar method. The company plans to use the room-and-pillar methods at the new Cottonwood portal. Long-wall mining has been proposed, but the extent to which it would eventually be applied is not now known. UP&L predicts that 60 percent overall coal extraction (40 percent remaining in place) is possible using a combination of these methods. At 60 percent extraction, the latest recoverable coal reserve estimates for company-owned mines is 190 million tons. Of the 190 million tons about 140 million are committed to the two power units at the Huntington plant and the first two units at the Emery site. This leaves 50 million tons for Units 3 and 4.



PROPOSED DEVELOPMENT AND COAL TRANSPORTATION

FIGURE 1-8



UP&L COAL LEASES

FIGURE 1-9

During the life of Units 3 and 4, about 30 percent of the fuel (20 million tons of coal) would be purchased to fulfill additional fuel requirements. Coal from additional federal leases would be desirable. The current moratorium on new coal leases, however, has made this source unavailable. New leases could be available by the year 1995 when additional coal would be needed. No new leases are now proposed and future location of new leases is unknown.

Coal analysis data, summarized in Table 1-5 and Table 1-6, are derived from over 250 samples at mining facilities already under operation and from 40 samples drawn from coal seams contiguous to current operations.

Cottonwood Portal of Wilberg Mine

Facilities for the Cottonwood portal would be concentrated in Cottonwood Canyon and a coal handling and loadout area would be built at the junction of Cottonwood and Straight Canyons (see Figure 1-8). The portal facility would occupy 7.5 acres and the handling and loadout facility would occupy 27.5 acres. Both sites are on private property. (Mining plans for the Cottonwood portal have not yet been submitted to the USGS and OSM for approval and concurrence by the surface managing agencies.) A 1,400 foot long culvert would carry Cottonwood Creek through the immediate area. The culvert would be large enough to meet requirements of the Surface Mining Control and Reclamation Act of 1977. Should the culvert be required to meet a 100 year storm, preliminary studies indicate that a culvert 9 feet in diameter would be required. The present road in Cottonwood Canyon would be relocated on top of the culvert. The road would be fenced through the portal development. Figure 1-10 is a plan of the portal facilities. The existing canyon road leading to the mine area would be upgraded and would have a 24-foot wide paved surface. The road would require a 50-foot wide right-of-way across the following lands:

Private	0.27 miles	1.64 acres
Forest Service Lands	0.32 miles	1.93 acres
State Lands	0.32 miles	1.93 acres
Public Lands Administered by BLM	1.88 miles	11.36 acres
Total	2.79 miles	16.86 acres

Coal would be transported from the portal to the proposed loadout facility by means of a 2.79 mile long, 42 inch, electrically-driven, covered, overland conveyor having six transfer points. It would parallel the existing Cottonwood Canyon road and would be similar to that shown in Figure 1-11. The route is shown in Figure 1-12. The conveyor would be constructed a few inches off the ground, except where crossing washes or other ground depressions.

A 100 foot wide corridor for the conveyor belt would be required across the following lands:

TABLE 1-5

Coal Analysis Data

	Average Percentage
Moisture	4.57
Ash	11.00
Volatile	40.17
Fixed Carbon	44.27
Sulfur	0.56

Note: For Units 3 and 4. Coal averages 11,900 Btu per pound. These data were developed by Utah Power and Light Co. from 290 face samples in the various mines in the area.

TABLE 1-6

Concentrated Trace Analyses of Samples From Deseret and Other Mines in Hiawatha Seam

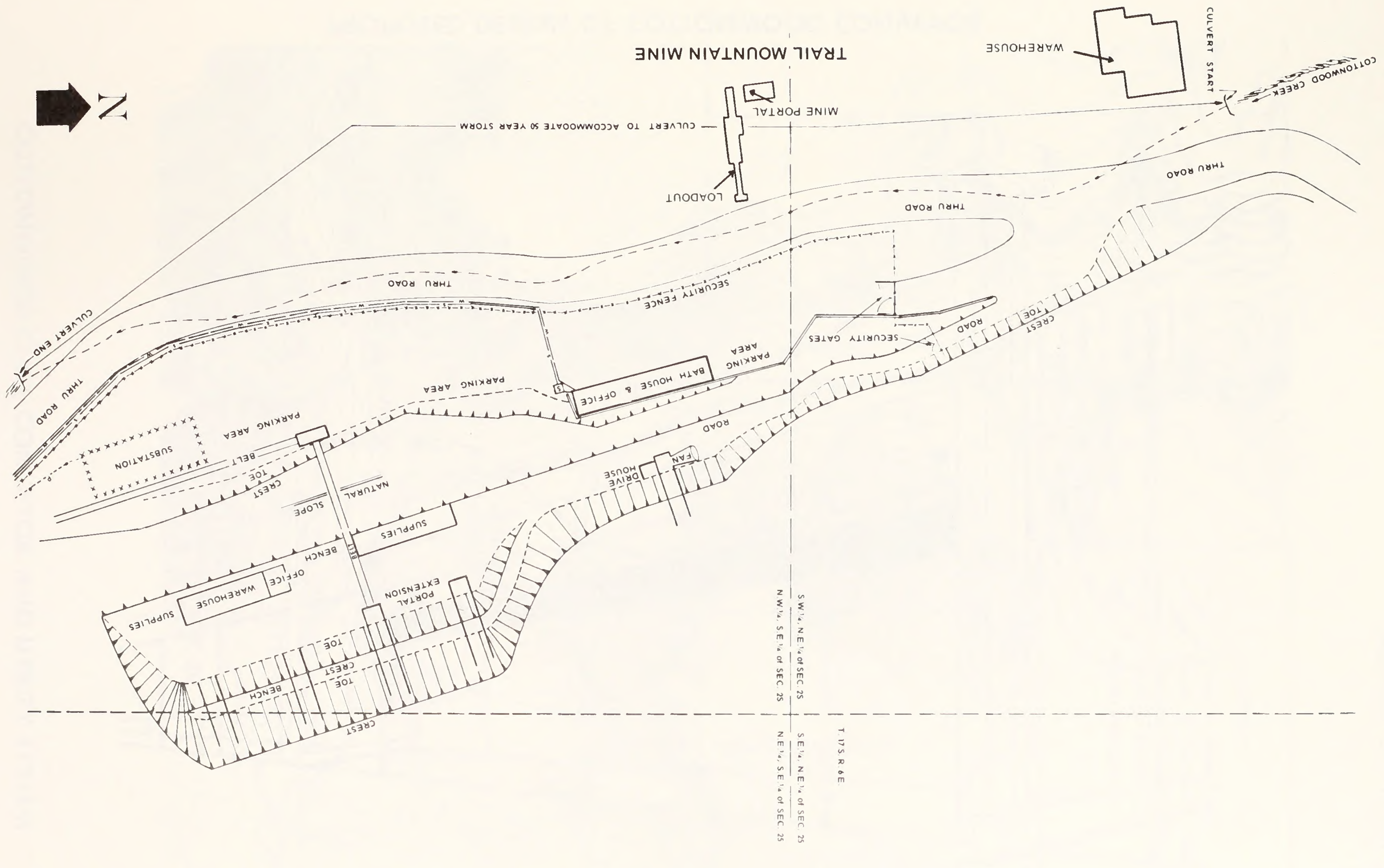
	Concentration (p/m)				
Element	Deseret Mine[a]	Star-point 1[b]	Deseret Mine[b]	Deseret Mine[b]	Range
Arsenic	0.16	1.00	<1.00	1.00	0.16 - 1.00
Boron	11.00	[c]133.50	[c]115.50	[c]121.50	11.00 - 133.50
Beryllium	1.10	[c]0.62	[c]0.23	[c]0.24	0.23 - 1.10
Cadmium	1.60	0.09	≤0.08	≤0.24	<0.08 - 1.60
Chromium	1.63	[c]6.23	[c]5.39	[c]5.67	1.63 - 6.23
Mercury[c]	0.02	0.06	0.01	0.03	0.01 - 0.06
Manganese	36.10	4.45 ([c]2.67)	5.39 ([c]3.85)	3.24 ([c]2.43)	3.24 - 36.10
Nickel	7.80	[c]2.67	[c]2.31	[c]2.43	2.31 - 7.80
Lead	3.80	3.56 ([c]4.45)	3.85 ([c]3,85)	4.05 ([c]5.67)	3.37 - 4.05
Selenium	2.42	2.40	1.90	2.20	1.90 - 2.42
Vanadium	48.50	[c]8.90	[c]7.70	[c]8.10	7.70 - 48.50
Germanium	0.10				
Fluorine	44.90	50.00	65.00	70.00	45.00 - 70.00
Yttrium	1.00	[c]4.45	[c]5.39	[c]4.05	1.00 - 5.39
Uranium		1.00	1.1215	0.92	
Barium		[c]17.80			
Antimony		0.20			
Cobalt		[c]1.30	[c]1.15	[c]0.81	

[a] Data provided by UP&L.

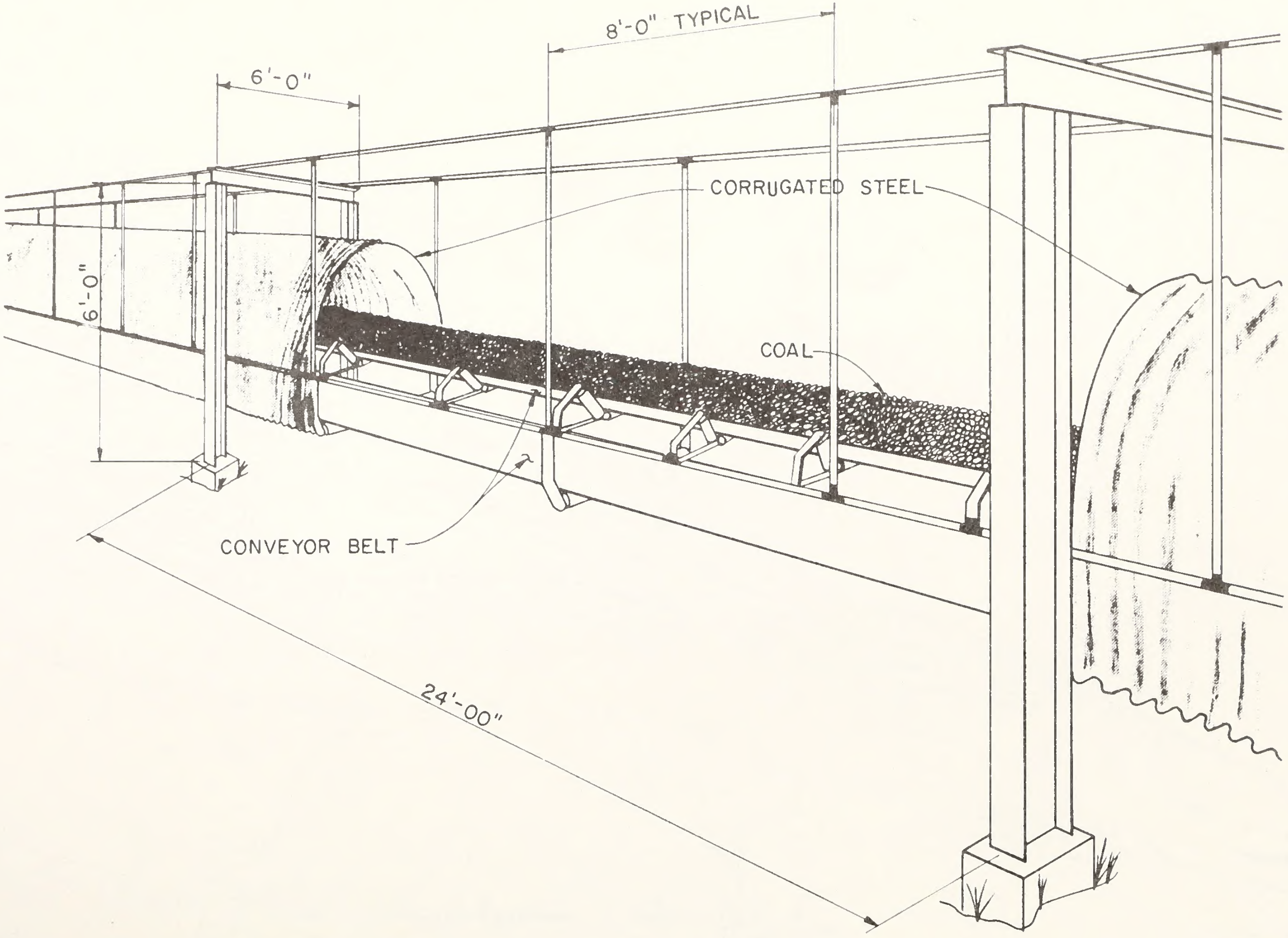
[b] Data provided by USGS.

[c] Semiquantitative six step spectrographic analysis of the ash.

[d] UP&L Environmental Report (1973, page 96) indicates North Emery Coal analyzed for Mercury by flameless atomic absorption and neutron activation varied from 0.035 p/m to 0.090 p/m.

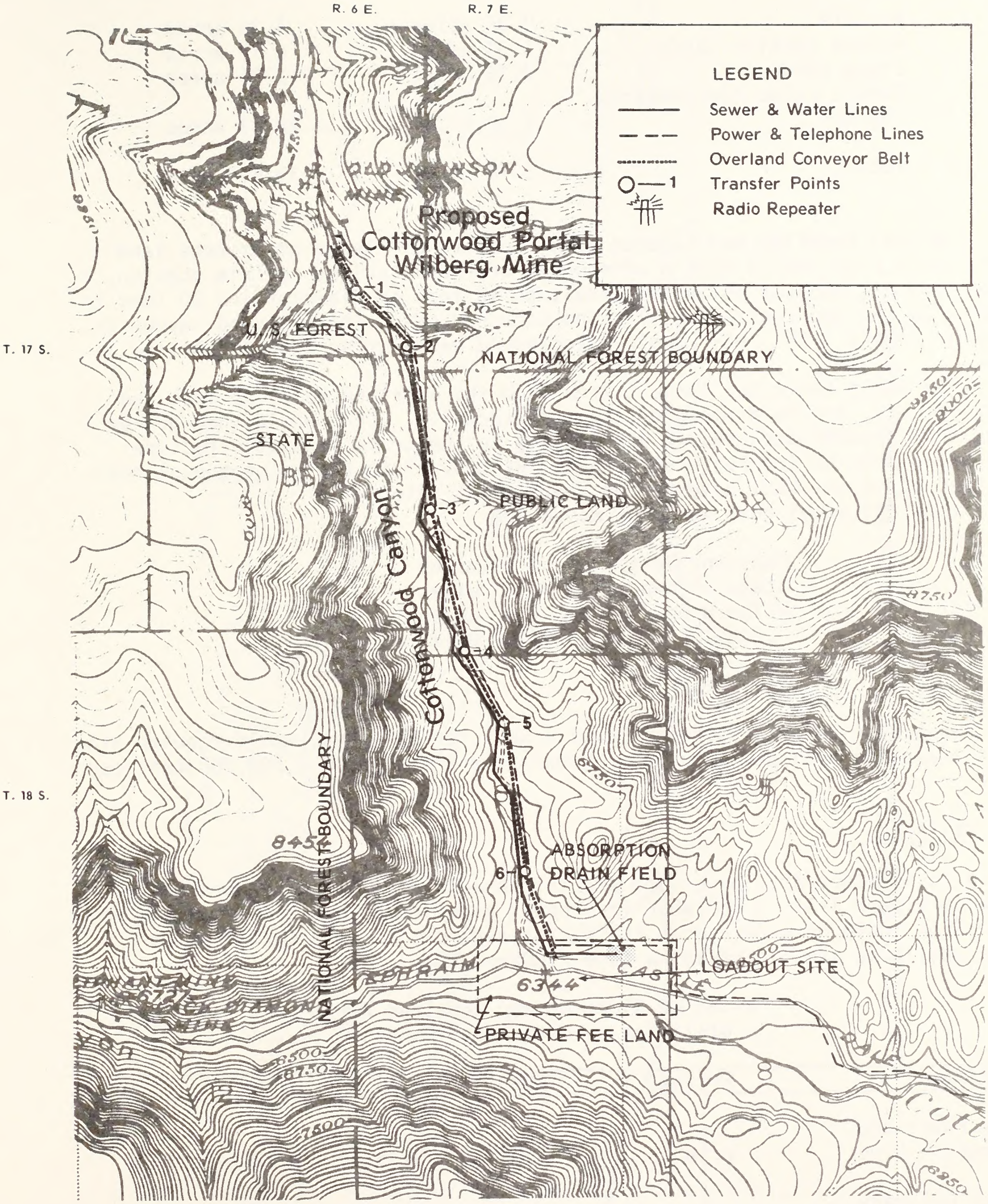


PROPOSED COTTONWOOD PORTAL LAYOUT



PROPOSED DESIGN OF COTTONWOOD CONVEYOR

FIGURE 1-11



COTTONWOOD COAL CONVEYOR AND UTILITY SYSTEM

FIGURE 1-12

Private	0.36 miles	4.36 acres
Forest Service Lands	0.34 miles	4.12 acres
State Lands	0.19 miles	2.30 acres
Public Lands Administered by BLM	1.90 miles	23.03 acres
Total	2.79 miles	33.81 acres

The coal handling and loadout area, located off lease on private land (see Figure 1-8), would have a warehouse, breaker station, reclaim station, truck loadout, substation, a stacking tube 12 feet in diameter and 80 feet in height, 25,000 ton coal stockpile, and access roads. The proposed layout is shown in Figure 1-13. All runoff water would be diverted into a settling pond.

Coal would enter the loadout area from the overland belt, go into the stacking tube, and be dispensed into the stockpile. Coal would then be conveyed to a breaker and crusher and finally to the truck loadout structure. Coal would then be trucked east on State Highway 29 to the Wilberg haul road and then along the haul road to the Emery plant site.

Total distances coal would be moved are:

Conveyor Belt	2.79 miles
State Highway 29	4.1 miles
Wilberg Haul Road	7.0 miles
Total	13.89 miles

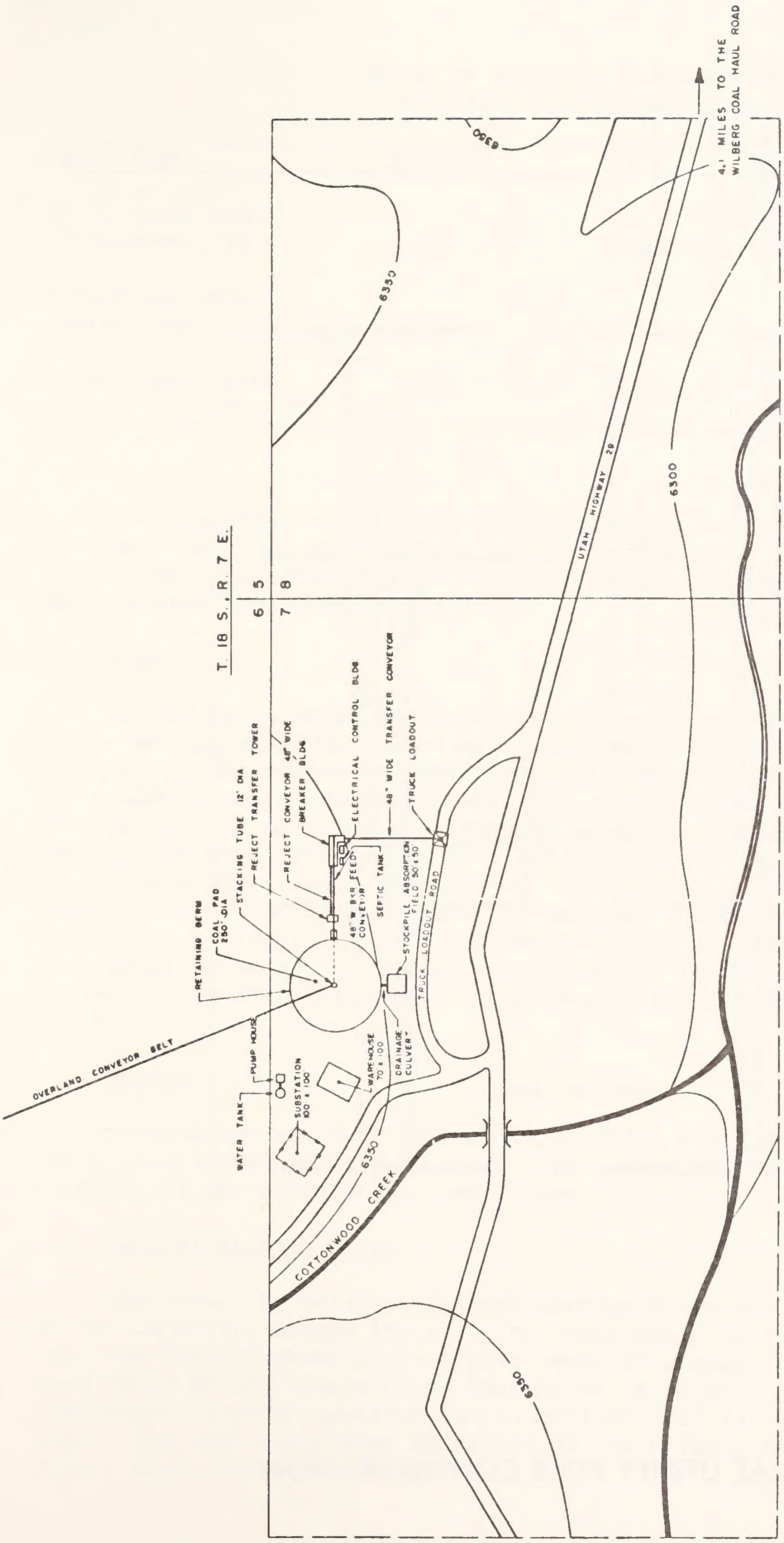
Two 8-hour shifts, working 5 days a week for 50 weeks, would require nine truck loads (40-ton) per hour to transport the anticipated 1,500,000 tons per year.

Utilities

A 25-kV electrical powerline and telephone line, with configuration as shown in Figure 1-14, a buried 6-inch sewer pipeline, and a 2-inch culinary water line would be required at the Cottonwood Portal. The corridors for these utilities are listed below (see Figure 1-12):

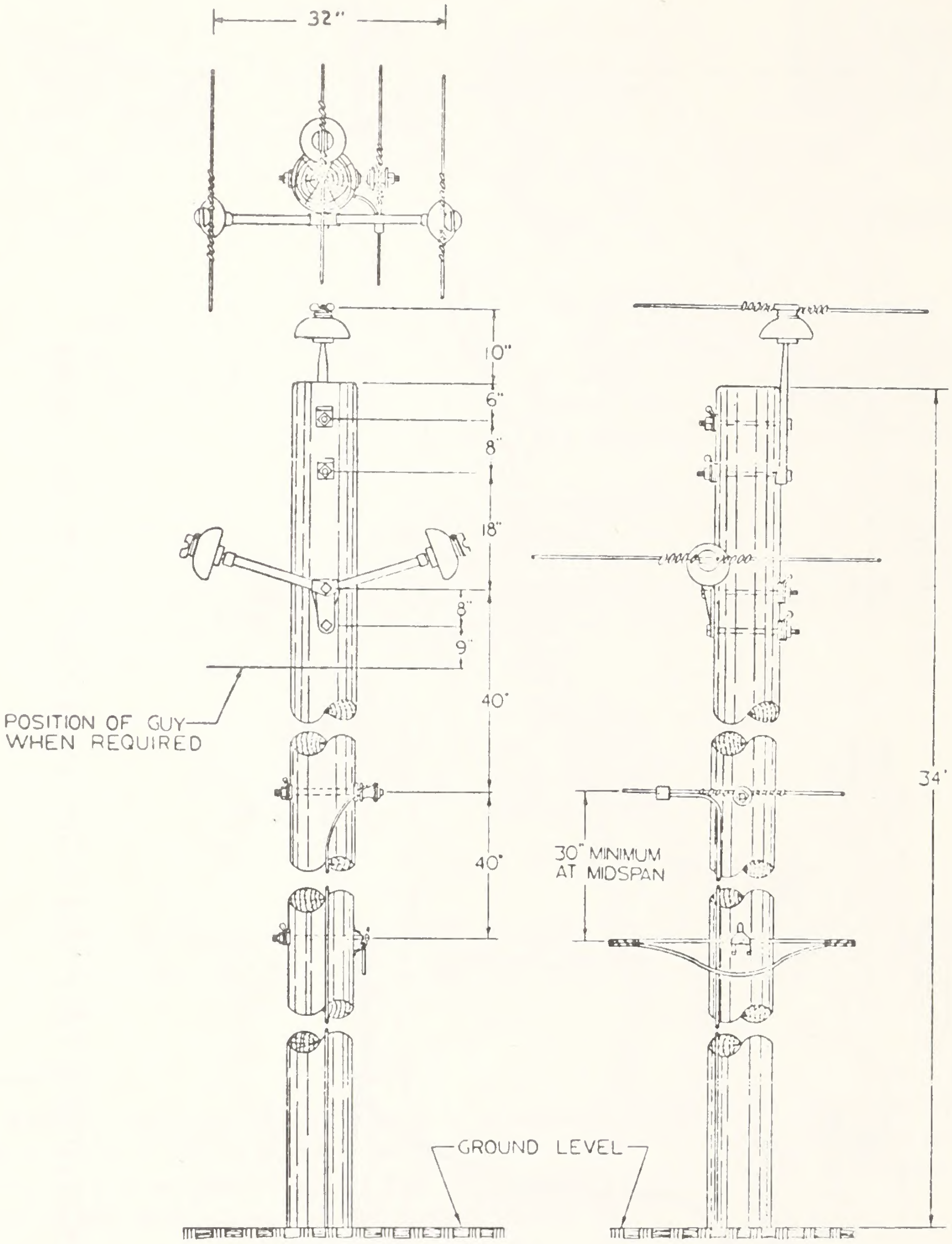
Miles of Right-of-Way Required for
Utilities in Cottonwood Canyon

Facilities	Private	BLM	USFS	State	Total
25-kV Power and Telephone Line	0.96	1.89	0.35	0.12	3.32
2-Inch Culinary Water Line	0.60	1.99	0.33	0.17	3.09
6-Inch Sewer Line	0.56	1.99	0.34	0.13	3.02



COTTONWOOD CANYON COAL HANDLING AND LOADOUT

FIGURE 1-13



TYPICAL UTILITY POLE CONFIGURATION

FIGURE 1-14

Acres of Right-of Way Required for
Utilities in Cottonwood Canyon

Facilities	Private	BLM	USFS	State	Total
25-kV Power and Telephone Line	2.33	4.58	0.85	0.29	8.05
2-Inch Culinary Water Line	0.73	2.42	0.40	0.21	3.76
6-Inch Sewer Line	0.68	2.42	0.41	0.16	3.67

The powerline would conform to "Suggested Practices for Raptor Protection on Powerlines," as described by the Raptor Research Foundation.

A radio repeater station would be installed on about 1 acre of USFS administered land (see Figure 1-12).

Water

During early development phases, approximately 5,000 gallons of domestic water per day would be hauled by truck from the town of Orangeville and stored in tanks at the mine site. It is anticipated that, after early development and based on water production from the adjacent Deer Creek Mine, as much as 400,000 gallons daily of excess water would be generated within the mine. To operate the mine, approximately 8,400 gallons per day (9.4 acre-feet per year) of culinary water would be required. This water would be treated for mine and domestic use. The water line would use same right-of-way as the coal conveyor to furnish culinary and dust suppression water at the coal loadout facility.

Water in excess of the mine and domestic needs would be treated as required by the Utah State Division of Health and discharged into Cottonwood Creek.

Sewage

Sewer water would be carried to a septic tank and 3-acre absorption drain field constructed on private land. The sewer line would be laid in the common corridor as explained above (see Figure 1-12).

Deseret-Beehive Mines

Coal from the existing Deseret-Beehive Mines would be transported by 40-ton capacity, tandem trucks. The route would be along the existing county road and State Highway 29 to a point east of Orangeville. A proposed new haul road would be constructed from that point to connect with the Wilberg haul road which is under construction to deliver coal for Units 1 and 2 (see Figure 1-8). The coal would then be hauled on the Wilberg haul road to the plant site. Haul distance would be:

Existing County Road	7.2 miles
Existing State Highway 29	1.0 miles
New Construction	1.1 miles
Wilberg Haul Road	2.6 miles
	11.9 miles

Two 8-hour shifts working 5 days a week for 50 weeks each year would require seven 40-ton truck loads per hour to transport the anticipated 1,000,000 tons per year from the Deseret-Beehive Mine.

WATER SOURCE AND DELIVERY SYSTEM

The Emery generating complex would not discharge waste water into any natural water course. Also all run-off water from the ash and sludge disposal area would be contained.

Industrial Water

The water supply and conveyance systems would be capable of providing the maximum need of 14,000 acre-feet of water annually (average use would be 13,000 acre-feet). Figure 1-15 shows the water budget for average water use.

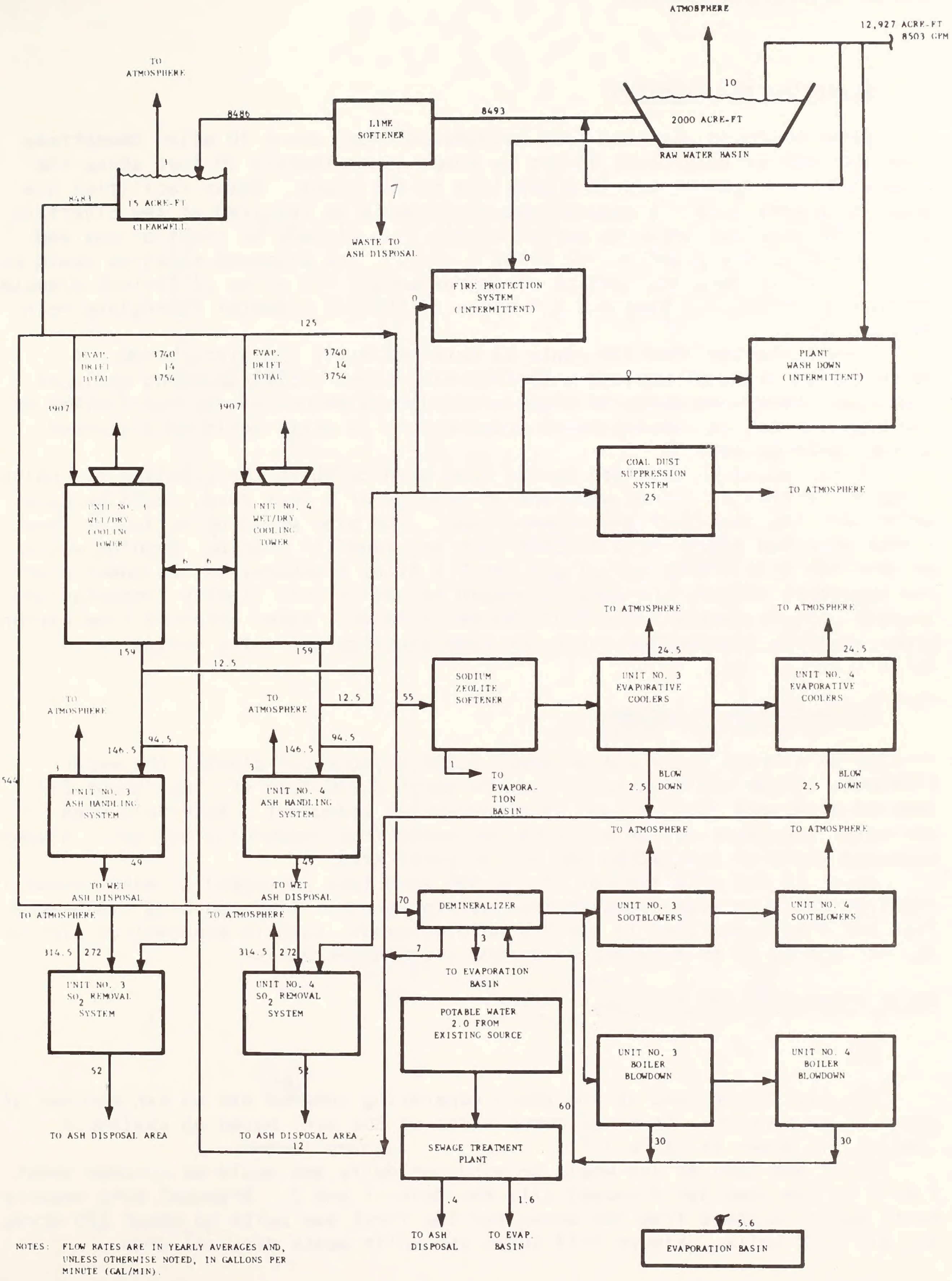
The company proposes to acquire the needed water from the following sources:

Source	Quantity (acre-feet)	Current Use
Ferron Creek	3,000	Irrigation
Emery Project Water	4,000	
Primary water	7,000[a]	Irrigation
Total	14,000	

[a] Primary water purchased from water users in the Huntington area would be used in Emery Units 3 and 4 by exchange.

A contract exists among the Emery Water Conservancy District, the Bureau of Reclamation, and UP&L for 6,000 acre-feet of water for municipal and industrial use. That quantity of water is now used for the Huntington Power Plant Units 1 and 2 and Emery Units 1 and 2. All other water is allocated to agricultural use.

A preliminary study indicates that, even though sufficient water appears to be available for Emery 3 and 4, two consecutive years of drought would cause a 3,000 to 4,000-acre-foot shorage in water supply among UP&L's six generating units (VHA, 1979).



NOTES: FLOW RATES ARE IN YEARLY AVERAGES AND, UNLESS OTHERWISE NOTED, IN GALLONS PER MINUTE (GAL/MIN).

WATER BUDGETS — UNITS 3 AND 4

FIGURE 1-15

Diversion and Pipeline

Water would be diverted from Cottonwood Creek about 10 miles downstream from Joes Valley Reservoir, lifted by pumps approximately 90 feet above the diversion, and transported in a pipeline to the plant. Water facilities are shown in Figure 1-16. A second pump house would be required at the diversion site. The pipeline would be buried within Utah Highway 57 right-of-way and would parallel the pipeline for Units 1 and 2. The proposed pipeline would be about 8.2 miles long and consist of approximately 4.3 miles of 24-inch diameter, fiberglass reinforced pipe and 3.9 miles of 20-inch diameter fiberglass reinforced pipe.

Land along the pipeline route is both privately and state owned. A 50-foot wide right-of-way and a 25-foot wide construction easement would be required. Forty-two acres of right-of-way would be needed for the 7 miles of the pipeline not on company owned property and 75 acres would be disturbed during construction.

Access would be provided by the road used to build the pipeline for Units 1 and 2. A trench, 4 feet wide and an average of 8 feet deep, would be excavated near the center of the right-of-way. The pipe would be buried at least 4 feet deep and placed on a crushed rock and sandfill cradle. Bedding would be obtained from a UP&L gravel pit about 3 miles southwest of the power plant. The uppermost part of the backfill would be native soil lightly compacted and graded. The disturbed areas would be revegetated. Water obtained from Ferron Creek would be transported using the same pipeline currently installed for Units 1 and 2.

Water Treatment System

At an average water use of about 4,300 gallons per minute, the water treatment system would annually require about 2,200 tons of lime, about 210 tons of alum, and about 4 tons of a commercial coagulant. Materials used in the water treatment system would be purchased from commercial sources. Sludge produced would be trucked to the ash disposal area.

About 11,400 acre feet of the 13,000 acre feet (average) of water annually required would be evaporated in the cooling towers. The remaining 1,600 acre feet would be evaporated in various holding ponds, used in ash control, in the SO_2 scrubbers, or be disposed of in the evaporation basins.

WASTE PRODUCTION AND DISPOSAL

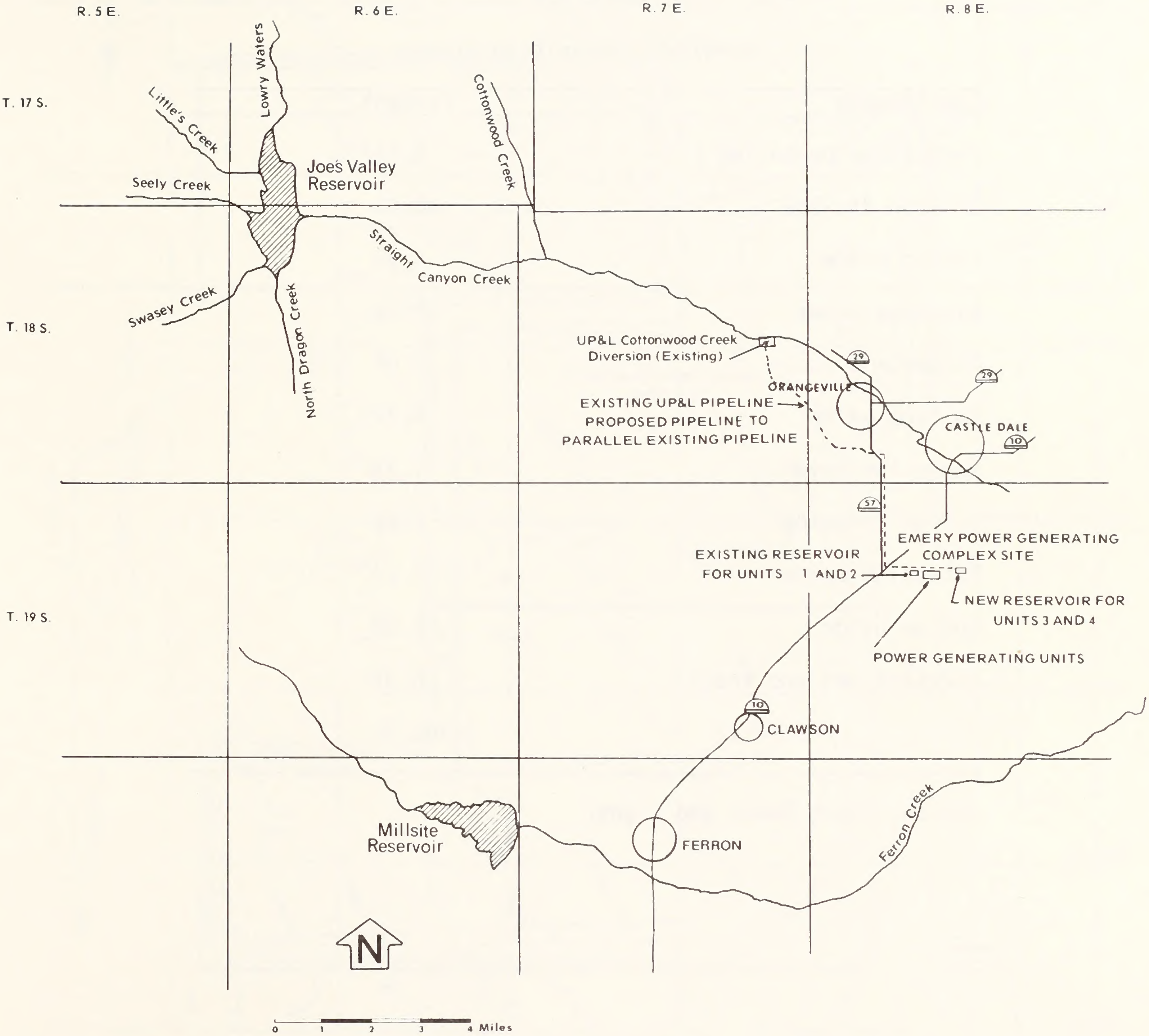
Ash

The coal to be used at the Emery generating complex has an ash content of about 11.00 percent. Chemical composition of the ash, based on available samples, is shown in Table 1-7.

About 640 tons of ash would be produced daily and would be trucked about 1 mile to the same ash disposal site for Units 1 and 2. Disposal area requirements would increase from 160 acres for the first two units to about 320 acres for all four units. Figure 1-17 shows the solid waste disposal area.

Sludge

Sludge from the SO_2 removal systems and from the raw water treatment system would be trucked to the solid waste disposal area (Figure 1-17). Daily



WATER SUPPLY SYSTEM

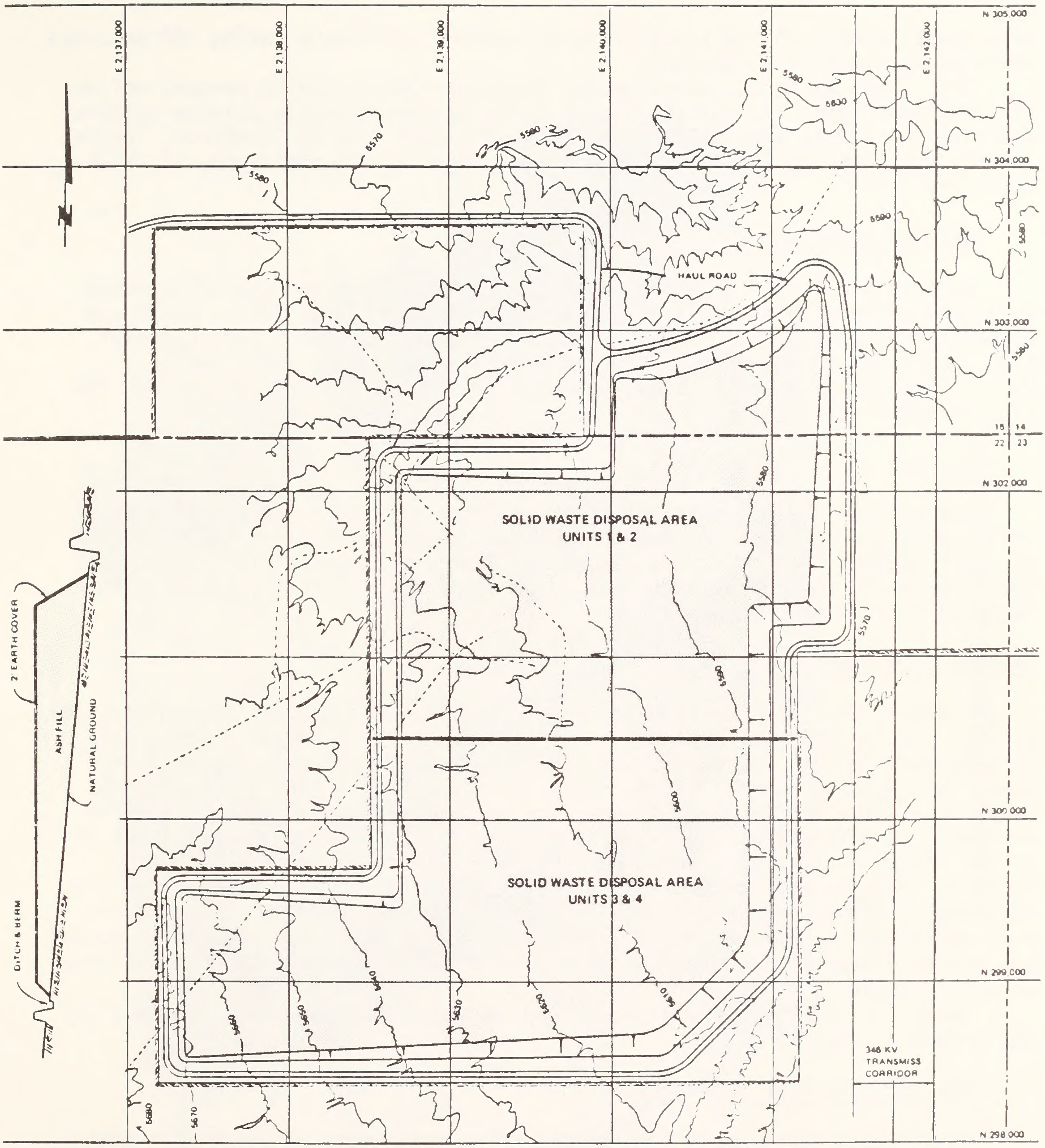
FIGURE 1-16

TABLE 1-7

Chemical Composition of Ash

Constituent	Percent
Phosphorus pentoxide	0.61
Silicon dioxide	50.40
Ferric oxide	4.36
Aluminum oxide	22.09
Titanium dioxide	1.04
Calcium oxide	7.77
Magnesium oxide	1.23
Sulfur trioxide	5.63
Potassium oxide	0.61
Sodium oxide	5.39
Undetermined and trace	0.87
Total	100.00

Source: Utah Power and Light.



SOLID WASTE DISPOSAL

FIGURE 1-17

discharges, with both units operating at maximum continuous rating (80 percent), would be approximately 380 tons.

The sludge would be approximately 50 percent water and 50 percent solids. The chemical composition of the sludge would be predominantly calcium sulfate and calcium sulfite with small quantities of unused lime or limestone, inerts, and fly ash. The proposed technique for disposal of ash and sludge is shown in Figure 1-18.

Garbage and Trash

Garbage and trash resulting from plant construction and operation would be deposited in a sanitary landfill at the site (see Figure 1-5). About one to two tons per week would be generated during construction. During operation, about 200 to 400 pounds per week would be deposited. The landfill, which would occupy about 2 acres, would be used for all four units during the life of the project.

Sewage

Sewage from the generating complex would be treated in an existing extended aeration package-type sewage treatment plant. The plant would provide at least secondary treatment as defined by EPA regulations. After treatment, the water would then be piped to the evaporation pond or to the fly ash loading area for use in dust abatement.

TRANSMISSION LINE

A 345-kV transmission line for Units 3 and 4 would be constructed parallel to the existing 345-kV line for Unit 1. It would extend from the plant site, through Spanish Fork Canyon, to the Camp Williams substation. Figure 1-19 shows the proposed route including those portions of the line which would be constructed with single circuit conductor on towers designed to be converted to double circuit use by placing a 24-foot extension on each tower. These so called "piggy back" towers would be installed with enlarged foundations. (Only the tangent structures would be built of "piggy back" design; angle and dead-end structures would be of conventional type design but constructed for easy conversion to double-circuit specifications.) Those portions which would use existing double circuit towers are also shown. Figures 1-20 and 1-21 show structure types.

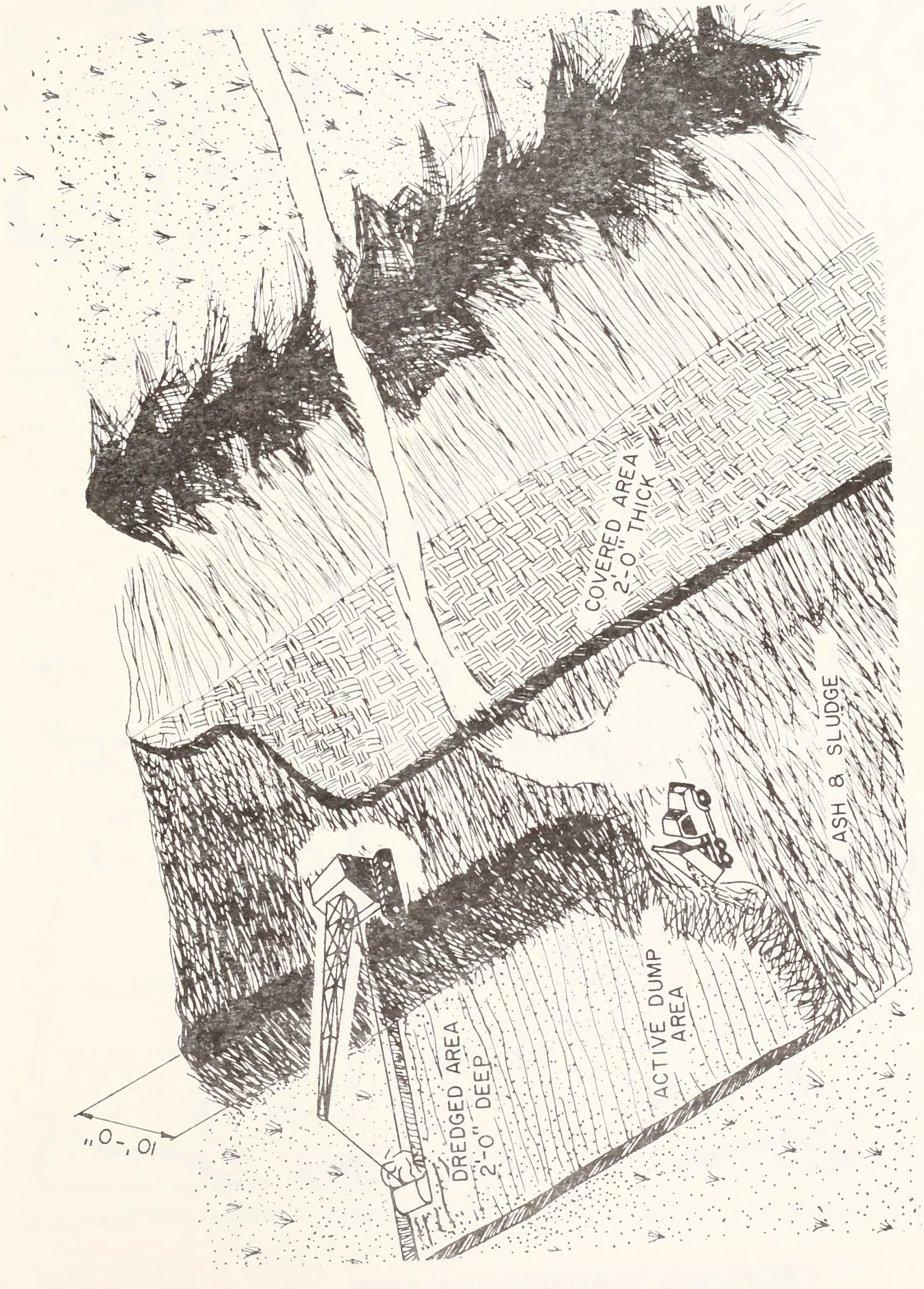
Table 1-8 indicates the right-of-way requirements and types of towers for the proposed line.

Transmission Line Construction

Construction work would take place during the summer at the higher elevations, but would continue throughout the year at lower elevations.

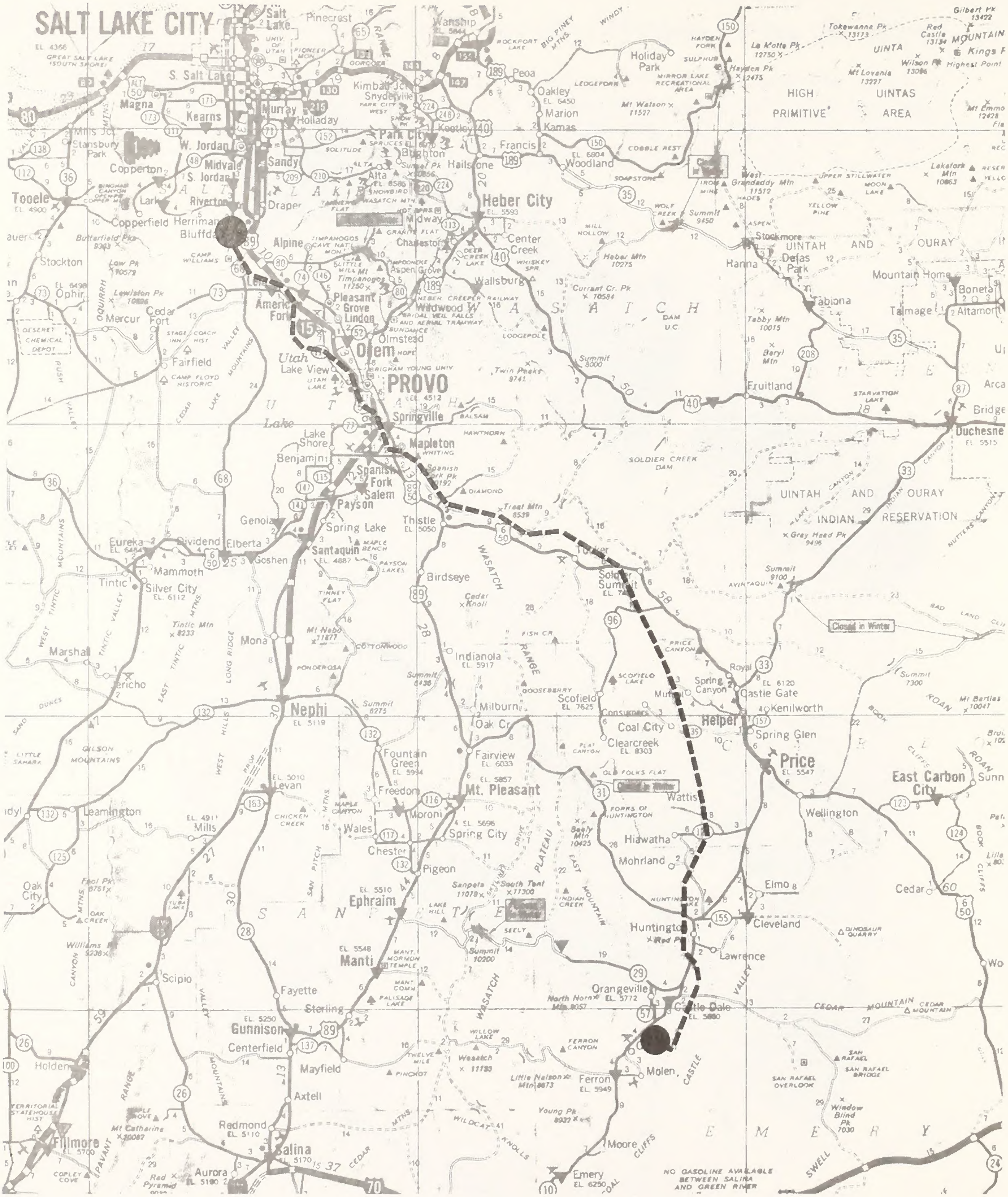
The proposed line would require the construction of spur roads from existing access roads to tower sites for the new line. Average road width would be 12 feet. Each structure site would be cleared of vegetation and holes would be dug for structure support and anchors. Up to 0.25 acre of vegetation would be cleared for each structure. Structure materials would be dull, galvanized steel lattice. Conductors would be non-specular (dull finish).

The erecting operation would include hoisting of structures and placement of assembled structures, leveling, squaring, backfilling, and anchoring.



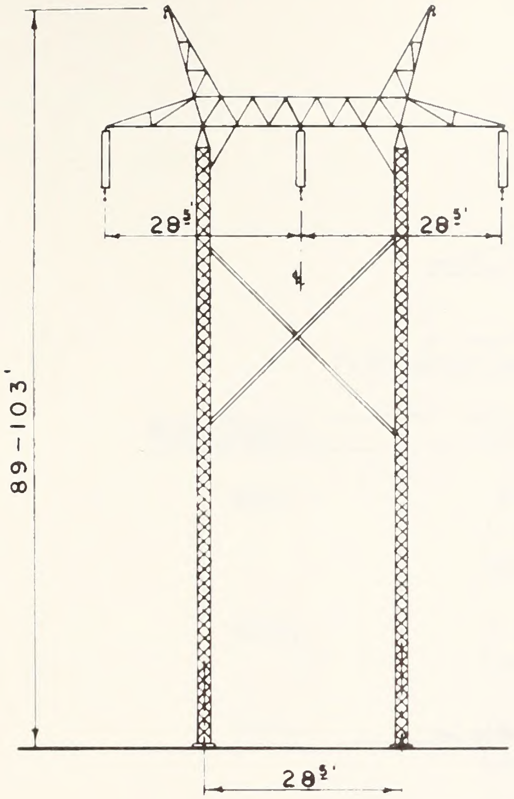
SOLID WASTE DISPOSAL TECHNIQUE

FIGURE 1-18

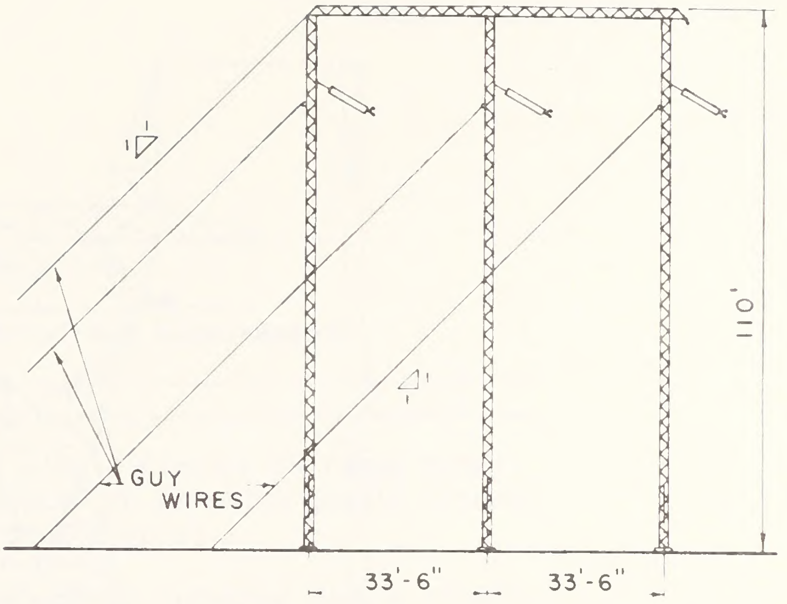


PROPOSED TRANSMISSION LINE

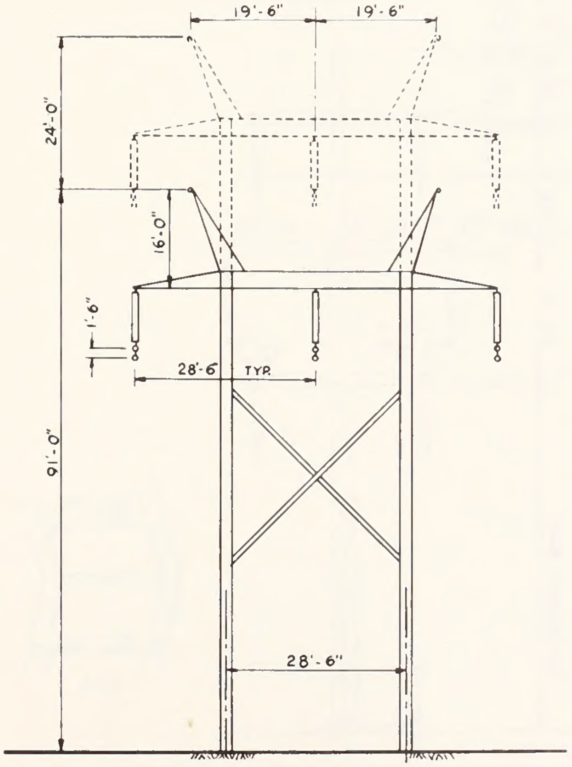
FIGURE 1-19



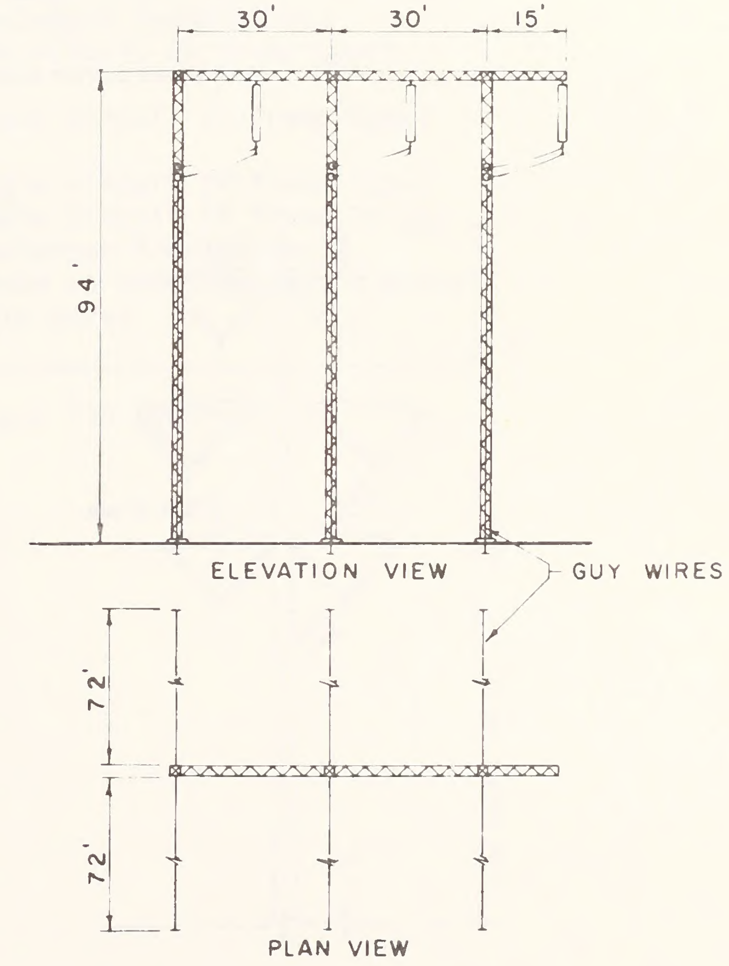
345 kV H FRAME STEEL TANGENT STRUCTURE



345 kV STEEL ANGLE STRUCTURE



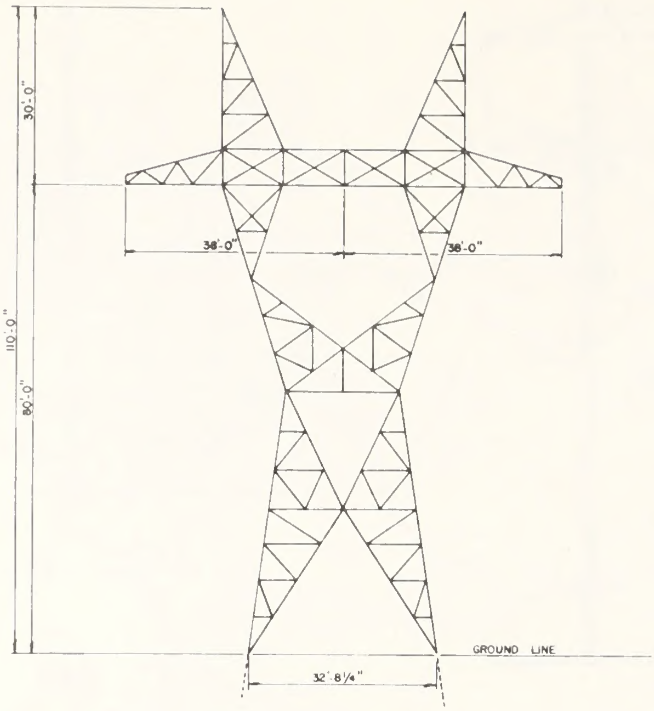
345 kV H FRAME "PIGGY BACK" STEEL TANGENT STRUCTURE



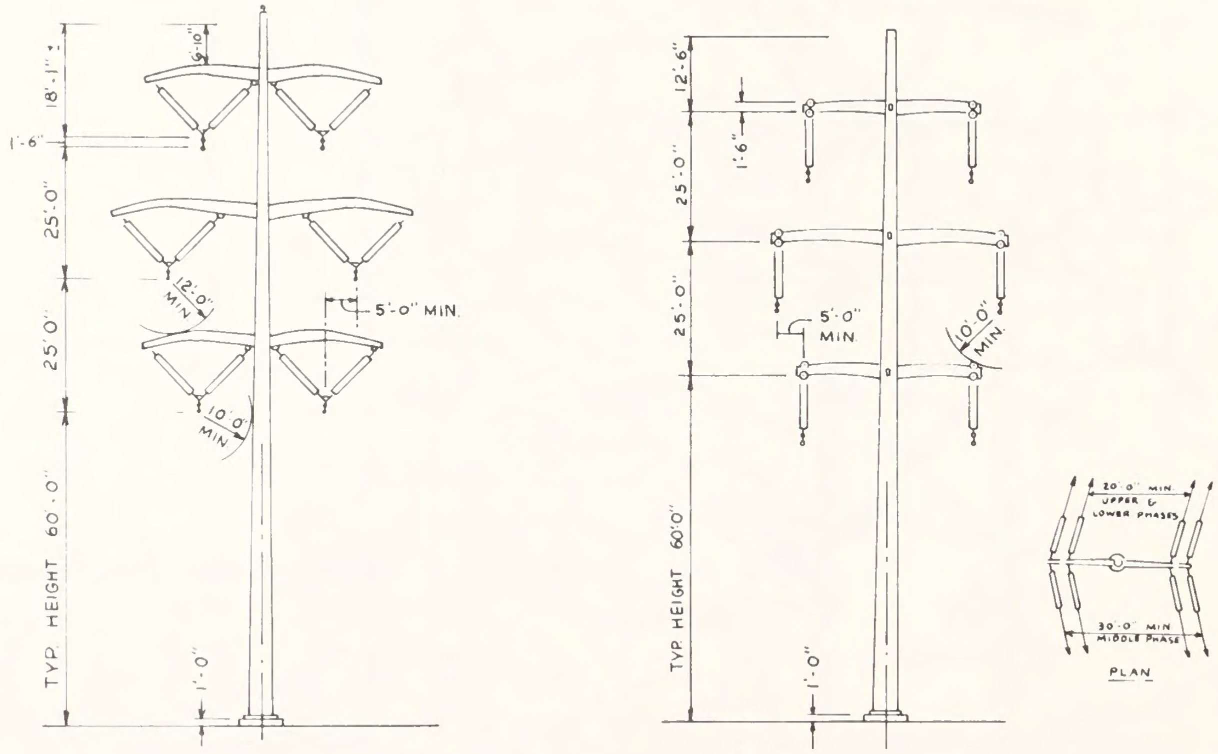
345 kV STEEL DEADEND STRUCTURE

TRANSMISSION TOWER STRUCTURES

FIGURE 1-20



345 kV SINGLE CIRCUIT STEEL SELF-SUPPORTING STRUCTURE



345 kV EXISTING DOUBLE CIRCUIT TANGENT STRUCTURE

345 kV EXISTING DOUBLE CIRCUIT ANGLE STRUCTURE

TRANSMISSION TOWER STRUCTURES

FIGURE 1-21

TABLE 1-8

Transmission Right-of-Way Requirements

Management	Length
BLM	16 miles single circuit (H frame type) 1 mile placed on existing double circuit towers (single pole)
USBR	1 mile placed on existing double circuit towers (single pole)
USFS	16 miles, single circuit (H frame "piggy back" with enlarged foundations) 1 mile single circuit (H frame type)
State	6 miles, single circuit (H frame type)
Private	33 miles single circuit (H frame type) 10 miles single circuit (H frame "piggy back" with enlarged foundations) 34 miles placed on existing double circuit towers (single pole)

Note: Right-of-way widths are 130 feet.

Temporary gates would be built where transmission lines would cross range or farm fences. Helicopters would be used between Tucker and the mouth of Spanish Fork Canyon. When helicopters are used in the operation, heavy equipment would not be required.

Maintenance

UP&L would patrol the line every month with fixed wing aircraft, every 6 months with helicopter, and every 12 months on foot. Line maintenance would vary from routine inspections to emergency repairs required to restore electrical service. The line would be maintained with the same type of equipment used in construction.

PROJECT CONSTRUCTION MATERIAL

Some construction materials may be shipped part way by rail, but all materials would eventually be trucked onto the site. Overweight and oversize loads would be required to transport the main steam drum, generator stator and rotor, deaerating heater, storage tank, and six beams for the boiler structure.

Cement, sand, and gravel would be transported over public highway by 30-ton trucks and dry bulk semi-trailers. Sand and gravel would be hauled from commercial sources near Camp Williams.

Structural fill for the generating complex site would be obtained from an existing borrow pit on private ground. The fill would be hauled by 30-ton trucks over 3 miles of county roads as shown on Figure 1-22. Fill for the coal haul road and conveyor would come from cuts along those routes.

Construction materials which would be needed at the generating complex site are listed in Table 1-9.

IMPLEMENTATION AND WORK FORCE

Figure 1-23 shows the UP&L proposed construction schedule for the third and fourth units. After construction, 146 workers would be needed to operate Units 3 and 4 at the complex. Another 442 workers would be required for coal mining and tranport. The proposed employment projections are shown in Table 1-10.

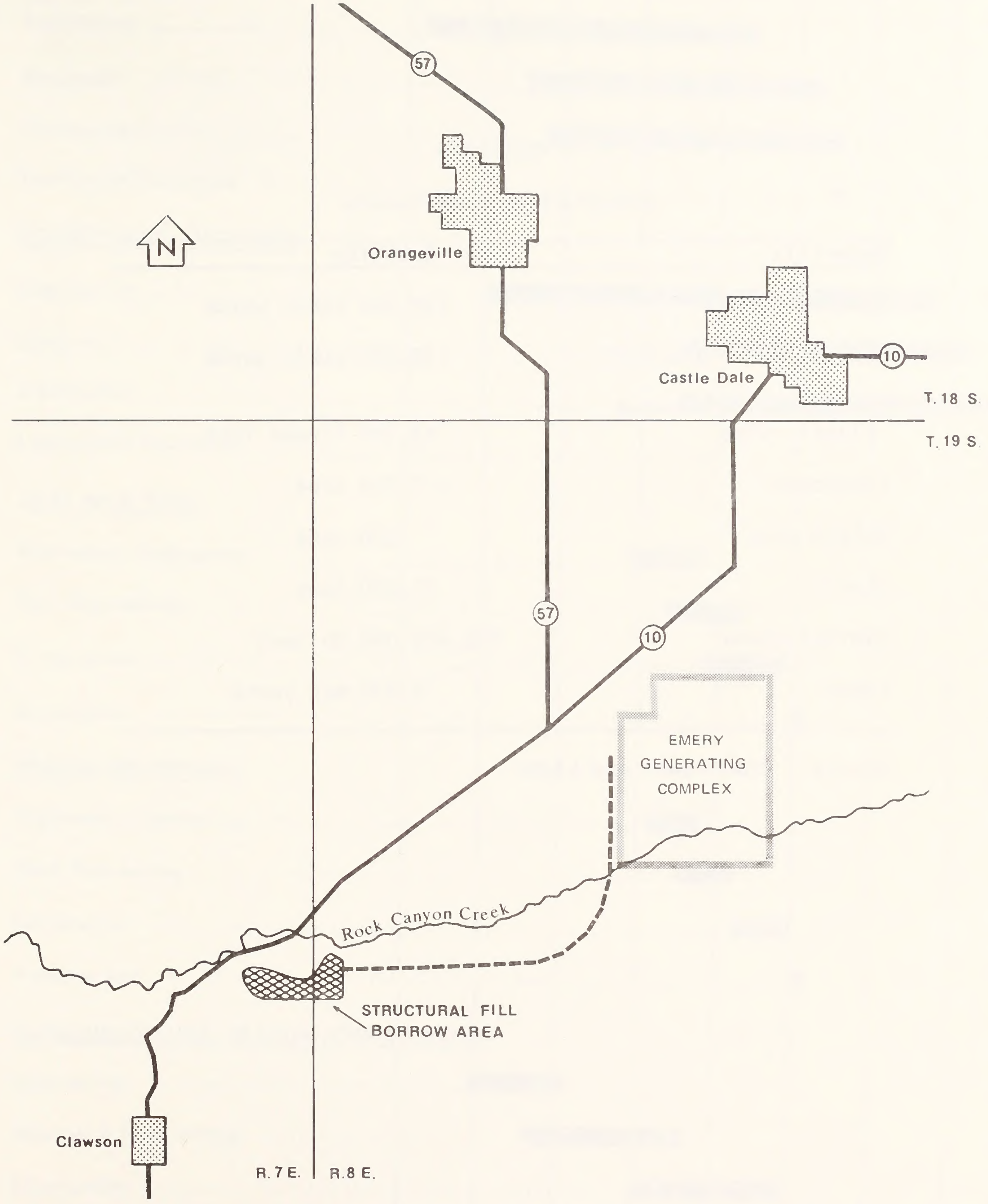
MONITORING PROGRAM

Meteorological Monitoring

North American Weather Consultants, under contract with Utah Power and Light, are continuously monitoring climatological data. A 50-meter meteorological tower, immediately west of the Emery switchyard, measures horizontal wind speed and direction at 10 and 50 meters. Temperature and humidity are measured at the 10 meter level.

Stack Emission Monitoring

In-stack monitoring systems would be installed to provide a continuous reading of pollutant concentrations. Monitoring would measure SO_2, NO_2, CO_2, and opacity. Carbon monoxide would be measured to control boiler firing. The opacity measurements would determine the visibility of stack emissions.



PROPOSED BORROW SOURCE

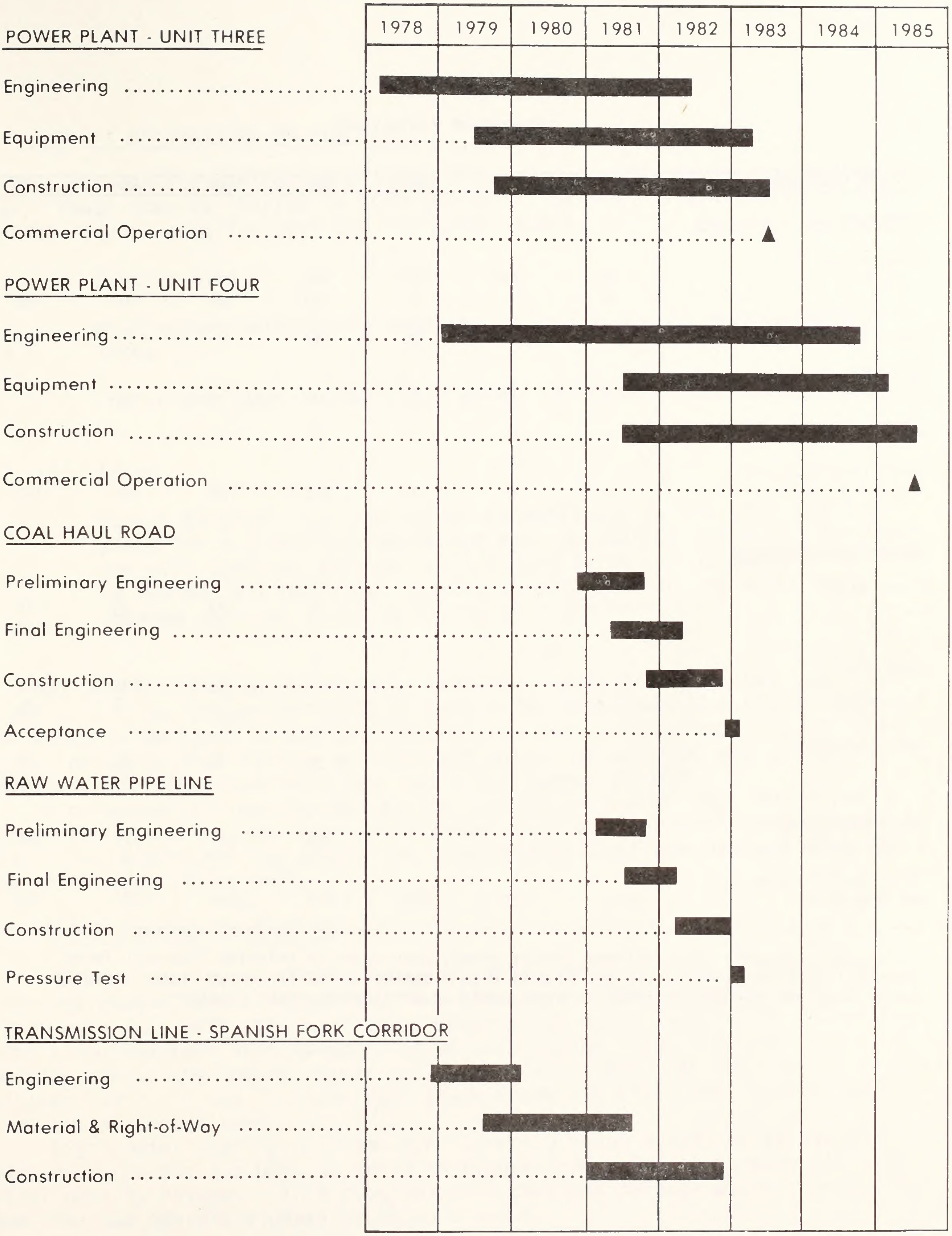
FIGURE 1-22

TABLE 1-9

Construction Commitments

Materials	Quantity
Concrete	122,000 cubic yards
Sand, gravel, and fill	112,000 cubic yards
Fiberglass reinforced plastic pipe	43,300 linear feet
Conductor	2,789 tons
Shield wire	270 tons
Steel	21,500 tons
Capital costs	700,400,000 dollars
Labor	2,670 man years

Source: Utah Power and Light.



CONSTRUCTION SCHEDULE

FIGURE 1-23

TABLE 1-10

Employment Projections
Units 3 and 4

Project Component	1979	1980	1981	1982	1983	1984	1985
Construction--Transitory							
Power Block							
3	15	160	475	700	345	--	--
4	--	--	--	120	160	700	345
Power Transmission Lines	--	--	20	140	--	--	--
Coal Mine Development							
3	--	20	75	200	50	--	--
Water Pipeline	--	--	--	45	--	--	--
Total Construction--Units 3 and 4	15	180	570	1,205	705	700	345
Operational-Permanent							
Power Block							
3				10	73	73	73
4				--	--	56	73
Coal Mine							
3				75	225	275	275
4[a]				--	--	75	125
Coal Transport							
3				23	23	23	23
4				--	--	19	19
Total Operations--Units 3 and 4				108	321	521	588
Total Construction and Operations	15	180	570	1,313	1,026	1,221	933

[a] This represents only the additional miners which, when added to existing mine work force (approx. 150), would be sufficient to meet Unit 4 demand. Coal for those users currently being supplied from Deseret-Beehive Mines would be provided by other suppliers.

Ambient Air Quality Monitoring

An air quality monitoring program is being conducted by the University of Utah. These studies started in 1974 and will continue for an indefinite period. The program includes the following studies:

(1) Particulates

High-volume particulate sampling daily for total suspended particulates.

Low-volume sampling daily and weekly for total suspended particulates.

(2) Gases

Sulfur dioxide, NO_2, and ozone are monitored in the area near the plant for a 3 week period during each quarter of the year. Monitoring will continue and the results used to determine seasonal effects on ambient air pollutant concentrations. Monitoring sites are located near the plant at Castle Dale and Ferron.

On July 5, 1978, North American Weather Consultants initiated the first phase of a plume dispersion study at Unit 1 for Utah Power and Light Company. The study is designed to evaluate parameters used in plume modeling calculations including such factors as transport winds, plume rise, and dispersion coefficients. The study will last until the summer of 1979.

A permanent air quality monitoring station (measuring SO_2, NOx, wind speed, and direction) has been established about 3 miles west southwest of the plant. An additional SO_2 monitor has been established near the entrance to the plant adjacent to U-10.

Water Quality Monitoring

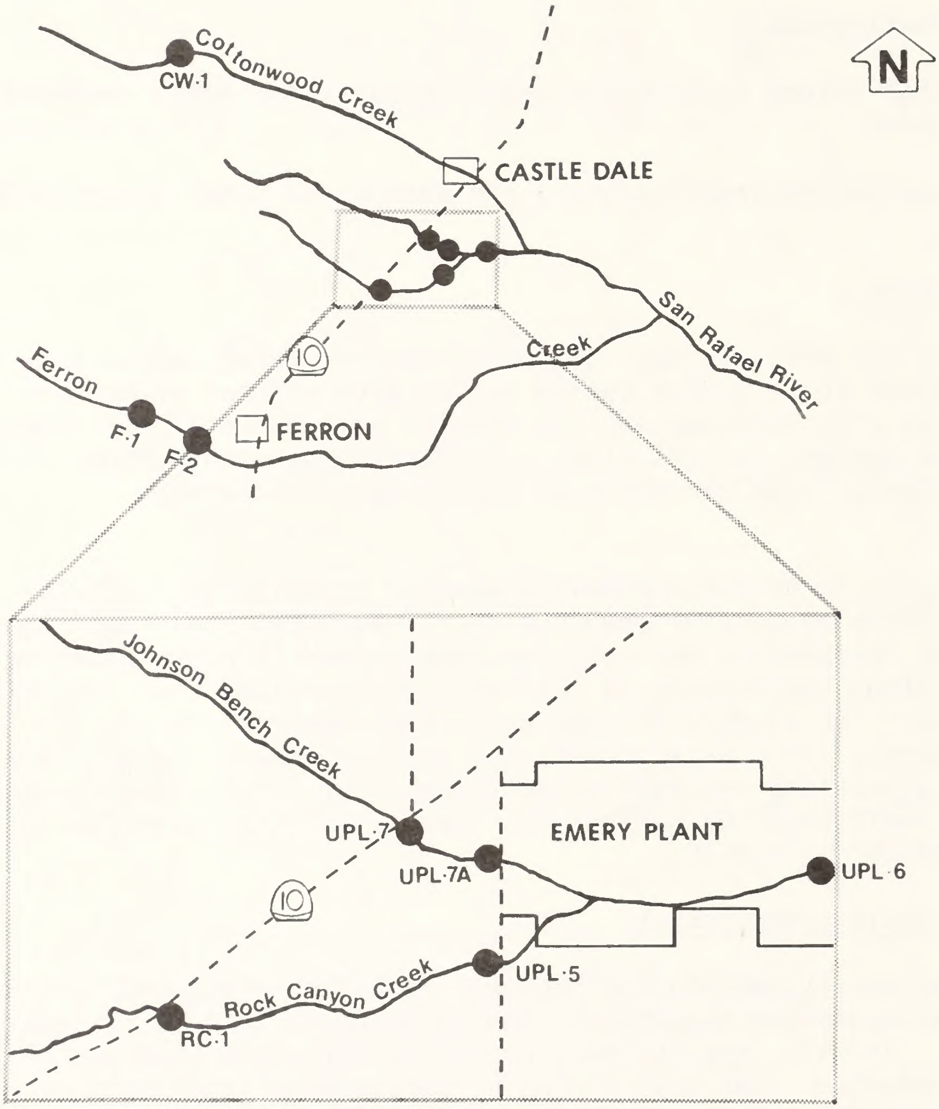
A water quality monitoring program, established for UP&L's Huntington plant by Vaughn Hansen Associates, was expanded in 1974 to include the Emery plant site. In 1975, the monitoring program was again expanded in connection with a Southeastern Utah Association of Governments study conducted under Section 208 of the Federal Water Pollution Control Act. At the conclusion, in October, 1977, of the "Section 208" study (Appendix I-2), UP&L monitoring stations were continued.

Eight water quality stations are currently being monitored by Vaughn Hansen Associates for UP&L as shown in Figure 1-24. This program would show water quality changes. This program would continue through plant construction and into the operation phase of Units 3 and 4.

Biological Monitoring

In June, 1974 UP&L contracted with the University of Utah to develop a vegetation map of the Emery area; to develop a species list; and to establish permanent vegetation study plots to determine stress, vigor, reproduction, damage, and disease on and among native plants. This study would continue throughout the life of the project.

No aquatic or terrestrial animal biological monitoring is proposed.



WATER QUALITY MONITORING STATIONS

FIGURE 1-24

Subsidence

Public law requires operators of federal coal leases to monitor hydrological systems associated with the lands being mined. Plans to comply with this law (30 Code of Federal Regulations [CFR] 211.31) were submitted to USGS on December 30, 1977. Plans have not yet been approved by USGS nor has concurrence been obtained from the applicable surface managing agency.

COMPANY PROPOSED DESIGN FEATURES AND GOVERNMENT AGENCIES STANDARD REQUIREMENTS

This section summarizes company proposed and standard federal agency measures which would minimize or eliminate adverse impacts to the human environment. These measures are expected to be employed because of existing laws, court decisions, agency policy, or firm applicant commitment. Alternatives (discussed in Chapter 8) also may reduce or eliminate impacts, but would require a change in the basic proposal.

It is assumed that sufficient funding and manpower would be available to properly enforce the standard requirement.

Measures Proposed by the Applicant

The applicant has committed the project to the following design features:

1. During clearing and earth-moving operations, water sprays would be used to control fugitive dust at the plant site, mine portal, and loadout facility.

2. Only a small portion of the ash disposal area would be worked at any one time. The area would be covered with topsoil and revegetated as the fill progresses.

3. All lattice transmission structures would be constructed with dull-galvanized steel.

4. Non-specular conductor would be used on all transmission lines.

5. Impervious linings would be installed in all reservoirs and lagoons.

6. Transmission lines would be constructed and maintained using the same techniques used during construction of the Unit 1 transmission line.

7. Transmission tower sites and access roads would be cleared with rotary blade, rubber-tire equipment. Only vegetation within 20 feet of the conductors would be removed.

8. Visual impacts from construction or existence of a project component would be partially mitigated by the applicant through the following actions:

    a. Roads would be either constructed with a hard surface, or would be sprinkled to reduce dust.

   b. Buildings and conveyors would be colored to blend with surrounding landscape.

   c. The plant site would be landscaped with native vegetation.

9. Coal dust would be controlled by:

   a. Covering the conveyors and live coal storage area.

   b. Spraying coal with water and a wetting agent wherever coal is transferred.

10. Water systems would be closed to prevent any waste water discharge into a natural drainage.

11. The carrying of firearms while on the job or in company-owned vehicles would be prohibited except for security guards.

Standard Measures Required of the Applicant by Federal Agencies

Authority for requiring the standard measures for projects of this type is granted under the following acts:

Organic Administration Act of 1897
Reclamation Act of 1902
Preservation of American Antiquities Act of 1906
Federal Aviation Act of 1958
The Wilderness Act of 1964
National Historic Preservation Act of 1966
Occupational Safety and Health Act of 1970
Clear Air Act as amended August, 1977
Executive Order 11593 of 1971 (Protection and Enhancement of the Cultural Environment)
The Federal Water Pollution Control Act and Amendments, 1972
Endangered Species Act of 1973
Archaeological and Historical Data Preservation Act of 1974
Federal Land Policy and Management Act of 1976
Surface Mining Control and Reclamation Act of 1977
Federal Noxious Weed Act of 1974

All measures outlined here could be modified, should situations warrant, by the appropriate federal official.

If the proposed project were approved, the applicant would be required to carry out the following measures on lands administered by Bureau of Land Management (BLM), U.S. Forest Service (USFS), and Bureau of Reclamation (USBR):

1. An operating plan, environmental analysis report or similar document, would be prepared covering the construction of all project facilities. The applicant would provide funding to the appropriate federal agencies for the purpose of financing one or more specialists for administration of construction activities.

2. Travel would be restricted to rights-of-way and existing public roads. Cross-country motor vehicle travel would be prohibited.

3. Water bars and intercepting dips would be constructed on access roads along the transmission lines to divert runoff to natural drainages. Location would be determined by the appropriate federal official. Temporary roads would be constructed "out-sloped" with berms removed.

4. After construction, disturbed areas would be revegetated with plant species common to the site and planted in a pattern which would compliment the line, form, color, and texture of the site.

5. The applicant would prepare a screening plan to minimize visual impact from structures. The plan must be submitted in writing to the appropriate federal official, and approved before starting construction.

6. All trash, packing material, and other refuse would be removed from construction areas on federal lands and disposed of in an approved sanitary land fill.

7. The applicant would provide funding for a qualified archaeologist who would be subject to approval by the appropriate federal official. The archaeologist would intensively survey the area prior to any surface disturbance. An approved archaeologist would be available, as needed, during surface disturbance. If the archaeologist determines that cultural values would be disturbed, construction would not proceed until appropriate action could be taken. (Chapter 9 contains a Memorandum of Understanding between the Bureau of Land Management and the State of Utah.)

8. No disturbance would be allowed on sites listed on, or eligible for nomination to, the National Register of Historic Places. (See Chapter 9, for Memorandum of Understanding between the Bureau of Land Management and the State of Utah.)

9. The applicant would provide funding for a qualified paleontologist who would be approved by the appropriate federal official. The paleontologist would conduct an intensive survey of all areas to be disturbed. An approved paleontologist would be available, as needed, during surface disturbance. If the paleontologist determines that paleontological values would be disturbed, construction would be halted until appropriate action could be taken.

10. The applicant would provide funding for a botanist approved by the appropriate federal official, to survey for possibly threatened and endangered flora. The botanist would intensively survey all areas to be disturbed and designate those areas in which no disturbance would be permitted. The botanist would be available, as needed, during surface disturbance.

11. In cooperation with the appropriate federal official, a fire control plan would be prepared. Internal combustion engines would be equipped with approved exhaust mufflers or spark arrestors.

12. Clearing would be restricted to the minimum necessary.

13. No disturbance or construction within USFS Roadless Area Review and Evaluation II (RARE II) areas would be allowed until final management determinations are made. No disturbance or construction would be allowed in possible BLM roadless areas prior to wilderness review.

14. The applicant would comply with grounding and clearance requirements of the National Electric Safety Code.

15. All existing improvements along the transmission facilities would be protected and any damage would be repaired.

16. A plan, as required by the Surface Mining Control and Reclamation Act, detailing surface rehabilitation would be prepared by the company. This plan must be approved by the appropriate government agency before any disturbance would be allowed in connection with mine surface facilities.

17. A revised mining plan for the Wilberg Mine, as required by the United States Geological Survey and Office of Surface Mining, must be prepared by the company, approved by the appropriate official, and concurrance obtained from the surface managing agency before any federal coal is removed from the Cottonwood portal.

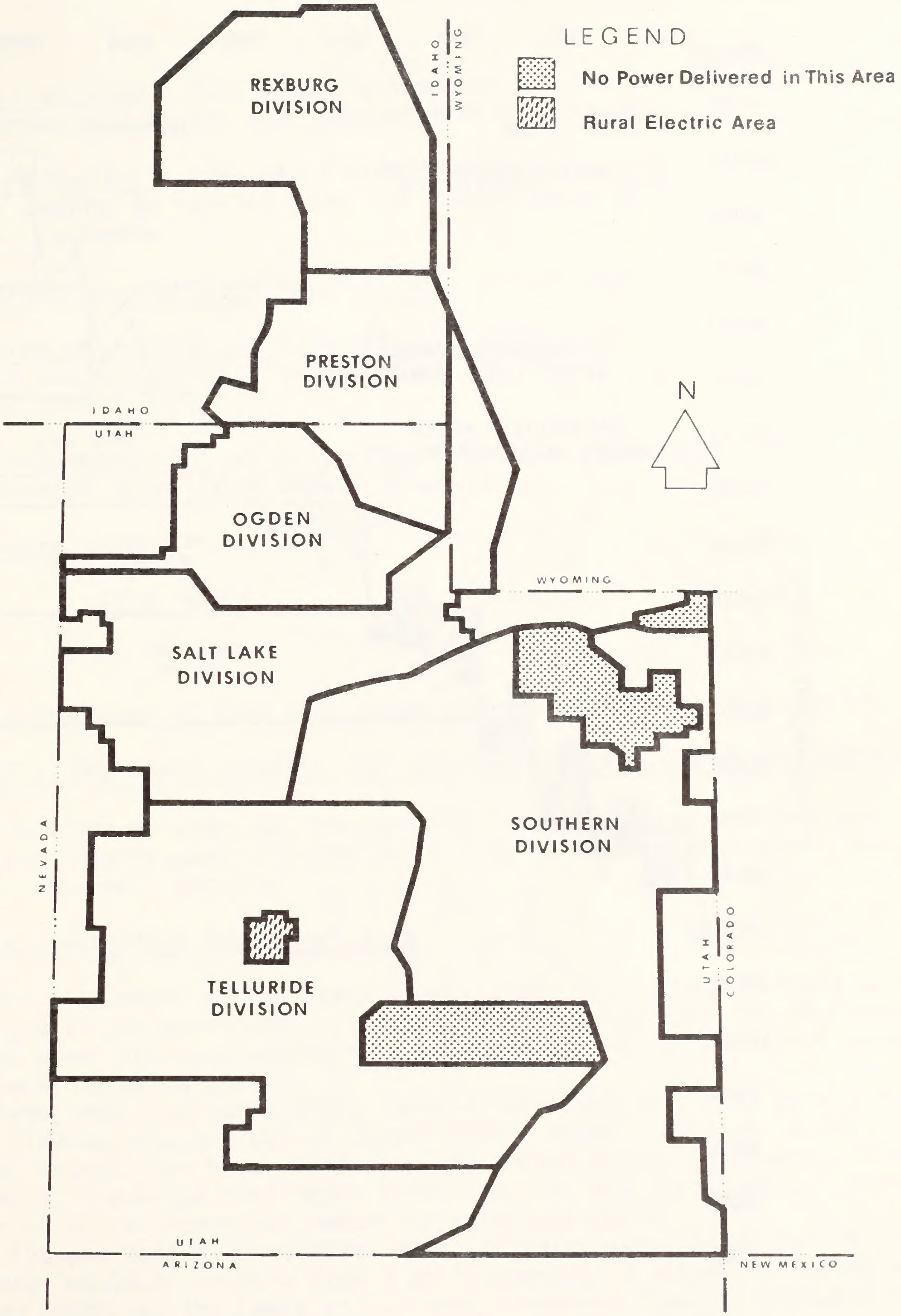
18. The applicant would be required to provide funding for the control of noxious weeds in areas where soil surface has been modified or natural vegetation has been removed. The noxious weed and areas would be designated by an official of the appropriate government agency.

PURPOSE AND NEED

According to UP&L, the Emery generating complex is needed to meet projected normal load growth in electrical energy requirements through 1985 in UP&L's service area, shown in Figure 1-25. No specific user would require any large block of power (over 5 MW) from Units 3 and 4 at the Emery site.

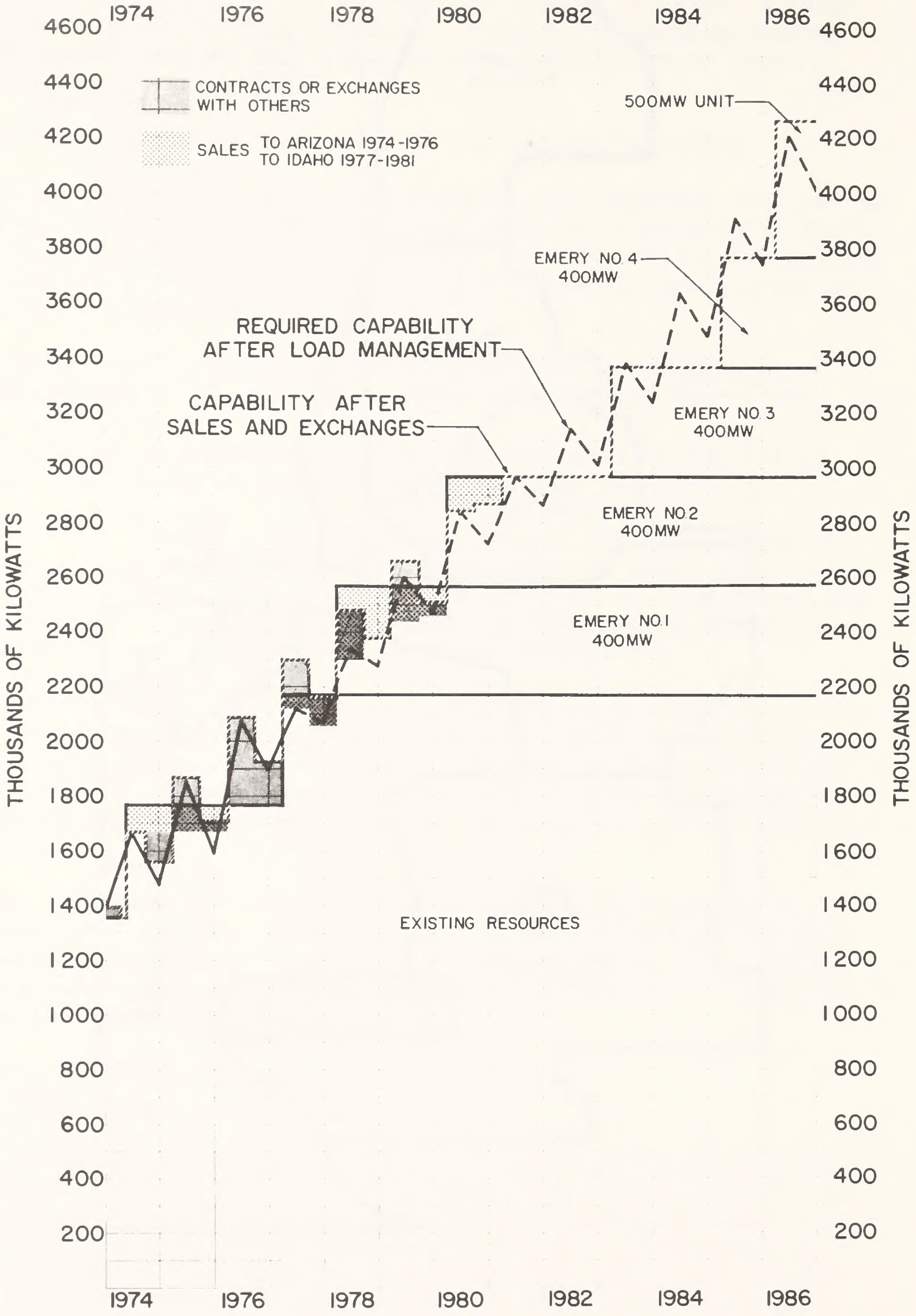
Final determination of need for this electrical power will be made by the Utah Public Service Commission. On February 8, 1978, UP&L submitted an application to the Utah Public Service Commission for approval to construct and operate Units 3 and 4. On November 3, 1978, the Utah Public Service Commission approved construction of Units 3 and 4. The Commission's findings and decision can be found in Appendix I-3.

By the winter of 1985, according to the UP&L load growth curves shown in Figure 1-26, the company will need 3,768 MW of power to meet requirements shown below:



TERRITORY SERVED BY UTAH POWER AND LIGHT COMPANY

FIGURE 1-25



PEAK LOAD AND GENERATING CAPABILITY

FIGURE 1-26

	Megawatts
Firm Peak Load - This power is proposed for the customer load in the UP&L system.	2,880
Sierra Pacific - UP&L has a firm contract with this company to furnish power for normal needs of local customers.	150
Intermountain Consumer Power Assoc. - firm sales	110
Deseret Generating and Transmission Cooperative - Rural Electrical Association serves the Uinta Basin area.	67
California Pacific Utilities Co. - UP&L has contracted to furnish normal load growth after 1975.	55
Spinning Reserve	506
TOTAL NEEDS............................	3,768

A detailed forecast of firm peak loads appears in Appendix I-4 and I-5.

RELATED PROJECTS, PROPOSALS, LEGISLATION, AND ENVIRONMENTAL IMPACT STATEMENTS

Several existing or proposed developments in eastern Utah and the Four Corners area are interrelated with the Emery Project because of similar environmental and socioeconomic factors.

Desert Lake Waterfowl Management Area

Before the settlement of the Emery County area, Desert Lake existed as a water settling area and marshland. To date, approximately $360,700 of federal funds has been spent for land acquisition and development for waterfowl management at the Desert Lake marshes.

In the late 1800s and early 1900s, several overlapping claims were filed on the water flowing into and out of Desert Lake. Water, totaling 39.296 cubic feet per second, has been claimed by the United States Government, Utah State Government, Cleveland-Huntington Canal Company, and individuals. These claims appear to be far above the amount of water available.

A study (Vaughn Hansen Associates, 1978) of water supplies at Desert Lake shows that water could be reduced from 4 to 10 percent if water, as needed by Utah Power and Light for the Emery Units, were converted from agricultural to industrial uses.

Under the water right laws of Utah, water will continue to be made available for the rights at Desert Lake and for the rights of other downstream users. Methods and locations of facilities to furnishing water to the rightful users may be changed. The details of these methods and facilities cannot be determined at this time.

During the extremely dry summer of 1977, a water user below Desert Lake claims that the Utah Division of Wildlife Resources (UDWR) refused to let water through the gates at the waterfowl management area when it was needed for his crops. UDWR claimed right to the water and held the water back to try to stabilize the management area. The affected downstream water user has engaged a lawyer and litigation over water rights at Desert Lake is imminent.

Utah Power and Light admits that water rights exist at Desert Lake and has committed to not interfere with these rights. The question that remains is who has the rights and what rights are present. The answer to this will not be available until after a court decision is made--probably not before May, 1979.

Generating Complexes

Five other coal-fired generating stations (either partially or completely in production) and one recently proposed are related to the proposal. Locations are shown on Figure 1-27. Table 1-11 shows the status of these complexes and their interrelationship with the proposed addition to the Emery complex.

Unit 1, at the Emery Complex, became operational in the spring of 1978. Unit 2 is under construction and scheduled to become operational in 1980. The work force currently living in the area could be phased into the new construction. The existing Wilberg and Deseret-Beehive Mines, along with the new Cottonwood Portal of the Wilberg Mine, would provide coal for all four Emery Units.

Environmental Impact Statements for Related Generating Complexes

First Unit-Huntington Canyon Generating Station and Transmission Lines

This environmental impact statement (EIS) was prepared by the USBR for construction of the first 430-MW unit at Huntington, Utah. This EIS (FES 72-10, May 10, 1972) is available from the USBR, 125 South State Street, Salt Lake City, Utah 84111.

Second Unit-Huntington Generating Station

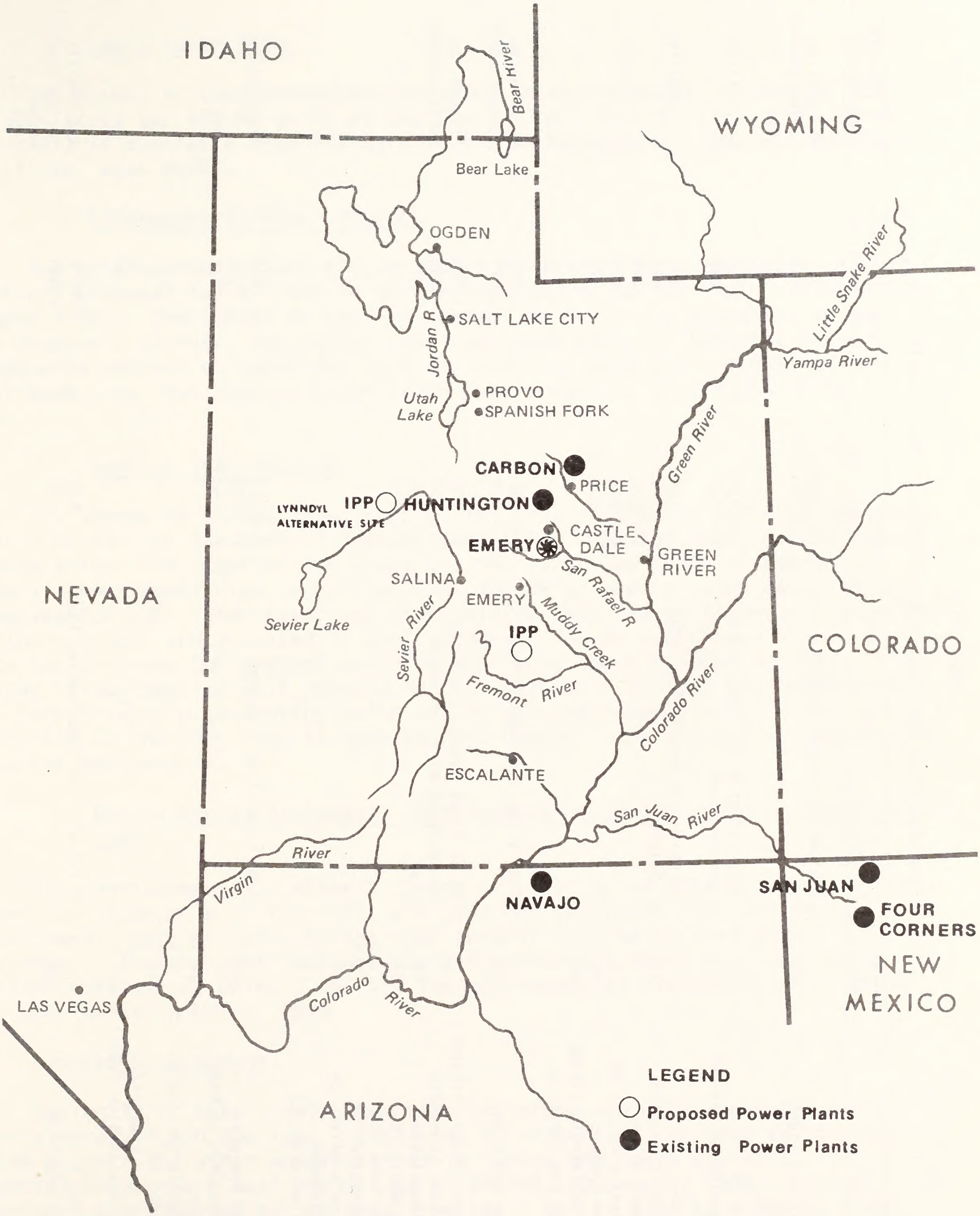
The Huntington Second Unit EIS was prepared by the USBR, Salt Lake City, Utah, the BLM, and the USFS. The EIS analyzed the second 430-MW unit at Huntington, Utah, and four corridors that could be used for the two proposed transmission lines from Huntington, as well as two possible lines from the Emery generating complex. A corridor for a 345 kV line from Sigurd substation to Camp Williams was also analyzed. This EIS (FES 75-11, January 23, 1975) may be obtained from the USBR, same address as above.

Four Corners and San Juan Power Plants

The USBR prepared EISs for the Four Corners and San Juan projects in northwestern New Mexico. Together, the two power plants are producing 2,800 MW of electrical power (San Juan FES 73-10, March 1, 1973; Four Corners FES 76-36, July 6, 1976).

Navajo Power Plant

The USBR prepared an EIS analyzing impacts from the proposed construction of a 2,310 MW generating complex in northern Arizona (FES 72-1, February 4, 1972).



INTERRELATED GENERATING STATIONS

FIGURE 1-27

TABLE 1-11

Coal-Fired Generating Complexes Interrelated With Emery Complex

Development	Percent Owned	Location	Size (no. units) (MW)	Date of Beginning Operation	Possible Interrelationships
Carbon		3 mi NW of Helper, Utah	1 - 105	1957	Air Quality
Utah Power and Light	100		1 - 66	1954	Socioeconomic
					Coal
San Juan		About 13 mi N of Four Corners	1 - 330	1973	Air Quality
Public Service Co. of NM	50	power plant	1 - 330	1975	
Four Corners		NW corner of New Mexico, near	1 - 176	1963	Air Quality
Arizona Public Service	15	Shiprock	1 - 177	1963	
El Paso Natural Gas	7		1 - 220	1964	
Public Service Co. of NM	13		1 - 800	1969	
Salt River Project	10		1 - 800	1970	
Southern California Edison	48				
Tucson Gas and Electric	7				
Huntington		9 mi W. of Huntington, Utah	1 - 430	1974	Air Quality
Utah Power and Light	100		1 - 430	1977	Socioeconomic
IPP (Intermountain Power Project)		10 mi N. of Caineville, Utah	1 - 750	1981	Air Quality
Intermountain Consumers		or about 10 mi N. of Delta,	1 - 750	1982	Socioeconomic
Power Association	15	Utah	1 - 750	1983	
City of Anaheim, CA	15		1 - 750	1984	
City of Burbank, CA	2.5				
City of Glendale, CA	2.5				
City of Los Angeles, CA	50				
City of Pasadena, CA	5				
City of Riverside, CA	10				
Navajo		4 mi E. of Page Arizona	1 - 750	1974	Air Quality
Salt River Project	21.7		1 - 750	1975	
Los Angeles Dept of Water			1 - 750	1976	
and Power	21.2				
Arizona Public Service Co.	14.0				
Nevada Power Co.	11.3				
Tucson Gas and Electric	7.5				
Bureau of Reclamation (US)	24.3				
Emery Units 1 and 2		2 1/2 mi S. of Castledale, Utah	1 - 430	1978	Air Quality
Utah Power and Light	100		1 - 430	1980	Socioeconomic
					Water
					Coal

Emery Power Plant

The Bureau of Land Management prepared an environmental statement (ES) for the first two 430 MW units at the Emery site. This ES (FES 77-7, March 15, 1977) is available from the Bureau of Land Management, 150 East 900 North, Richfield, Utah 84701.

Intermountain Power Project

The Intermountain Power Project (IPP) proponents have submitted a preliminary proposal for a 3,000 MW generating complex in south-central Utah (see Figure 1-28). The Bureau of Land Management is currently preparing an ES. The proposal, however, has raised some very controversial issues and the proponents decided on March 30, 1978, to continue with the proposal at the Salt Wash site, but also to investigate an alternative site north of Delta, Utah.

Central Utah Project

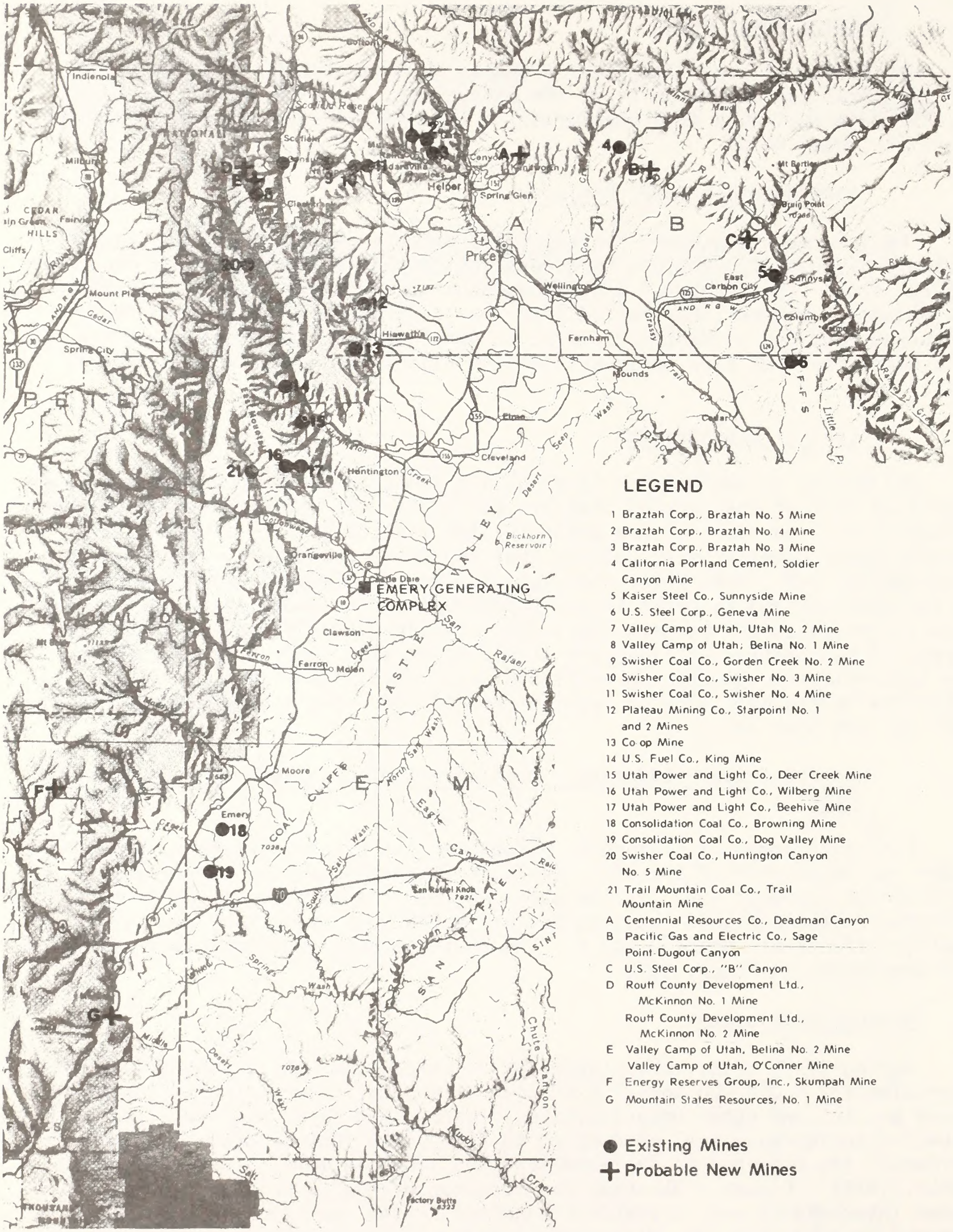
The Bureau of Reclamation is proposing construction of hydro-driven power plants as part of the Central Utah Project (CUP). In the Spanish Fork Canyon transmission line right-of-way grant for the first two units at Emery, the Federal Power Commission stipulated that 400 MW of transmission capacity be reserved for CUP. Utah Power and Light claims this leaves inadequate capacity in the corridor and resulted in their proposal for an additional line. Power from the proposed CUP project would be available about October 1, 1989. The Bureau of Reclamation will prepare an EIS which will analyze the impacts of the hydro-electric generating units and associated power lines, including the inter-tie to the UP&L line in Spanish Fork Canyon. The statement's completion date has not been set.

Environmental Statement: Development of Coal Resources in Central Utah

This environmental statement, being prepared by an interagency task force under the leadership of the USGS, analyzes the projected coal and energy development, through 1990, in the same geographic area covered within this statement. The analysis includes the projected coal needs for, and the air quality effects of, Units 3 and 4. The environmental statement is scheduled for completion in March, 1979.

Mineral Development

During 1977, total coal production in Carbon and Emery counties was approximately 8,000,000 tons. Expansion of production, related to the proposed project and other opportunities in Carbon and Emery counties, is expected to increase coal production to 24,000,000 tons by 1990. Mining personnel are expected to increase from the 1,607 in 1974 to 6,960 by 1990 (USGS, 1978). Figure 1-28 shows the location of the 21 producing mines and seven interrelated new, probable coal mines. Site specific and cumulative effects of projected mine developments are analyzed in the Environmental Statement: Development of Coal Resources in Central Utah.


LEGEND
1 Braztah Corp., Braztah No. 5 Mine
2 Braztah Corp., Braztah No. 4 Mine
3 Braztah Corp., Braztah No. 3 Mine
4 California Portland Cement, Soldier Canyon Mine
5 Kaiser Steel Co., Sunnyside Mine
6 U.S. Steel Corp., Geneva Mine
7 Valley Camp of Utah, Utah No. 2 Mine
8 Valley Camp of Utah; Belina No. 1 Mine
9 Swisher Coal Co., Gorden Creek No. 2 Mine
10 Swisher Coal Co., Swisher No. 3 Mine
11 Swisher Coal Co., Swisher No. 4 Mine
12 Plateau Mining Co., Starpoint No. 1 and 2 Mines
13 Co-op Mine
14 U.S. Fuel Co., King Mine
15 Utah Power and Light Co., Deer Creek Mine
16 Utah Power and Light Co., Wilberg Mine
17 Utah Power and Light Co., Beehive Mine
18 Consolidation Coal Co., Browning Mine
19 Consolidation Coal Co., Dog Valley Mine
20 Swisher Coal Co., Huntington Canyon No. 5 Mine
21 Trail Mountain Coal Co., Trail Mountain Mine
A Centennial Resources Co., Deadman Canyon
B Pacific Gas and Electric Co., Sage Point-Dugout Canyon
C U.S. Steel Corp., "B" Canyon
D Routt County Development Ltd., McKinnon No. 1 Mine
Routt County Development Ltd., McKinnon No. 2 Mine
E Valley Camp of Utah, Belina No. 2 Mine
Valley Camp of Utah, O'Conner Mine
F Energy Reserves Group, Inc., Skumpah Mine
G Mountain States Resources, No. 1 Mine
● Existing Mines
+ Probable New Mines
EMERY GENERATING COMPLEX
Indianola
Scofield Reservoir
Scofield
Milburn
Helper
Spring Glen
Price
Wellington
East Carbon City
Sunnyside
Columbia
Hiawatha
Fernham
Mounds
Mount Pleasant
Spring City
Elmo
Cleveland
Huntington
Orangeville
Castle Dale
Clawson
Ferron
Molen
Moore
Emery
Buckhorn Reservoir
San Rafael Knob
Factory Butte
C A R B O N
E M
CASTLE VALLEY
SAN RAFAEL
COAL CLIFFS
CEDAR HILLS

INTERRELATED COAL MINING

FIGURE 1-28

Utah Power and Light Company operates four coal-fired generating plants in Utah. All are supplied from company-owned coal mines near Huntington, Utah. The Gadsby, Hale, and Carbon plants collectively consume about 1 million tons of coal annually from the Deseret-Beehive mines. Coal from the Deseret-Beehive Mines would be dedicated to the new units at Emery and the Gadsby, Hale, and Carbon plants would have to use coal from commercial suppliers. The Huntington plant receives coal from the contiguous Deer Creek Mine. As a result of expanding the Wilberg Mine, some coal dedicated for UP&L's Huntington power plant would be used for Units 3 and 4. Since the coal would still be needed for the Huntington plant, UP&L would mine additional areas north of the present mining operation through the existing Deer Creek Mine portal. This would require modification to the Deer Creek Mining proposal. An environmental analysis would be required before modification. Total coal needs for the two units at Huntington and four units at Emery would be 210 million tons.

There has been oil and gas production in the area, but it is not active at this time. The only current production is in the Ferron area. Recent discoveries in the "overthrust" area have brought on increased exploration activities, however. These activities are expected to continue and increase dramatically in the next 5 years. In the past few years there has been considerable renewal of uranium interest in the area southeast of the proposed generating complex, extending to Green River, Utah as shown on Figure 1-29. Future development of these resources would have interrelated socioeconomic impacts with the Emery proposal.

Federal, State, and Local Land Use Controls and Plans

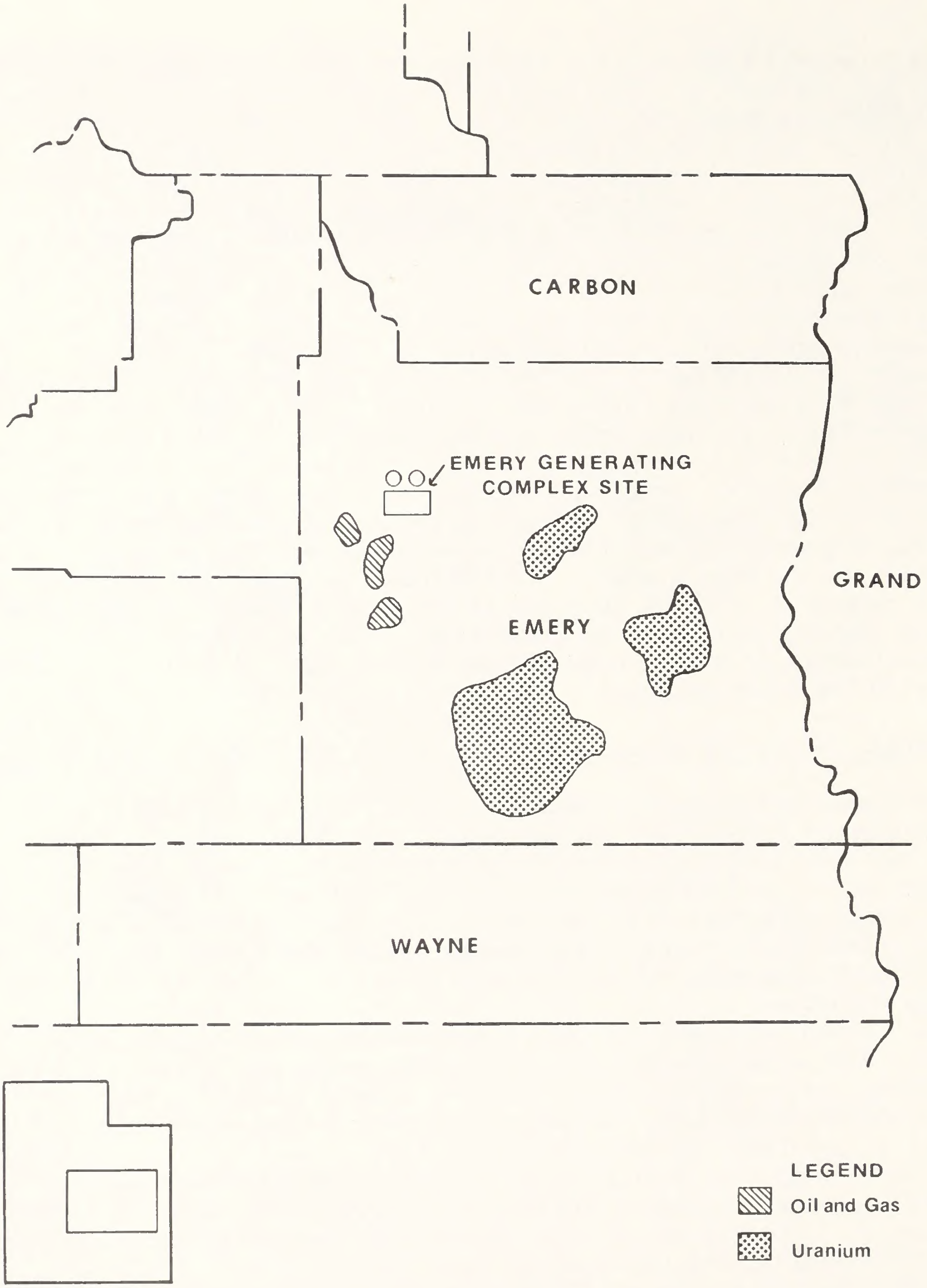
Within the past 6 years, numerous regional and local plans and controls were completed or updated for Carbon, Emery, and Utah counties. Most of these plans do not specifically address the proposed Emery generating complex or associated facilities and transmission lines. Estimates of growth potential, in plans completed before 1970, generally fall short of recent population increases. The detail found in the county master plans does not take into consideration probability of rapid growth in Castle Valley due to the expanding energy industry.

A new zoning ordinance for Utah County became effective on January 7, 1977. This ordinance indicates that utilities would need to obtain a building permit before beginning construction in the county. Should a proposal be in violation of the ordinances, the permit would be denied and the applicant would have to petition for rezoning.

The BLM, Price Area office, Utah, recently completed Management Framework Plans (MFP) for the Huntington and Wattis planning units which include the Emery proposal. These plans address the utility corridors for Units 1 and 2; Units 3 and 4 would share the same corridor.

The MFP for the San Rafael Planning Unit, prepared by BLM, is scheduled to be revised by August, 1978, at which time corridors and impacts from population increases would be identified.

The Ferron-Price Land Management Plan and Environmental Statement, for the Manti-LaSal National Forest, is scheduled for release in draft form in August, 1978. This plan will provide management direction for areas affected by the Proposal. Existing Multiple Use Management plans are providing direction for current management on other USFS Administered Land.



INTERRELATED OIL, GAS, AND URANIUM AREAS

FIGURE 1-29

Related Studies

The State of Utah Energy Office through the Interagency Task Force on Power Plant Siting has prepared a report on prequalifications of alternative power plant sites in Utah. This report includes sites at Green River, Wellington, Nephi, and Delta. The report is available from the State of Utah Energy Office, 231 East 400 South, Salt Lake City, Utah 84111.

GOVERNMENT AUTHORIZING ACTIONS

For the proposed project to be completed, it would be necessary for federal, state, and local governments to take several actions. The federal actions, which would authorize the applicant's proposals, necessitated preparation of this ES. Federal actions are listed in Table 1-12 and State of Utah and local actions appear in Table 1-13.

TABLE 1-12

Federal Authorizing Actions

Agency	Action	Authority
Bureau of Land Management	[a]Grant 100-foot tramway right-of-way across 1.9 miles of public land for a 42-inch coal conveyor.	[b]Federal Land Policy and Management Act of 1976, 90 Stat. 2743, 43 USC 1701, Title V, USC 1761 et seq.
	Grant 130-foot right-of-way, including necessary access, across about 16 miles of public lands for a 345-kV transmission line. Modify the right-of-way across about 2 miles of public land.	As above.
	[a]Grant a 20-foot right-of-way across 1.9 miles of public lands for a 25-kV distribution line with a telephone line underbuilt.	As above.
	[a]Grant a 50-foot right-of-way across 1.9 miles of public land for a 24-foot wide paved two-lane road.	As above.
	[a]Grant a 10-foot right-of-way across 2.0 miles of public land for a 2-inch culinary waterline.	As above.
	[a]Grant a 10-foot right-of-way across 2.0 miles of public land for a 6-inch sewer line.	As above.

Continued

TABLE 1-12 (continued)

Agency	Action	Authority
U.S. Geological Survey (USGS)	Approve mining plans and administer coal lease operation at Wilberg Mine, Cottonwood Portal and Deseret-Beehive in consultation with U.S. Forest Service, approve surface facilities within coal lease.	[c]Mineral Leasing Act of 1920, 41 Stat 450, 30 USC 181; Section 189, Secretarial Order No. 2948, of October 6, 1972; 43 CFR Part 23.
Office of Surface Mining, Reclamation, and Enforcement	Review and certify the adequacy of the mining and reclamation plan.	Surface Mining Control and Reclamation Act of 1977 (Public Law 95-87) 30 CFR 715 and 716.
U.S. Forest Service	[a]Grant 100-foot wide right-of-way across 0.34 mile of Forest Service lands for a 42-inch coal conveyor.	[b]Federal Land Policy and Management Act of 1976, Title V, 43 USC 1761 et seq.
	Grant 130-foot right-of-way, including necessary access, across about 17 miles of Forest Service land for a 345-kV transmission line.	As above.
	[a]Grant a 20-foot right-of-way across 0.35 miles of Forest Service land for a 25-kV distribution line with a telephone line underbuild.	As above.
	[a]Grant a 50-foot right-of-way across 0.32 miles of Forest Service land for a 24-foot wide paved two lane road.	As above.

Continued

TABLE 1-12 (continued)

Agency	Action	Authority
	[a]Grant a 10-foot right-of-way across 0.33 miles of Forest Service land for a 2-inch culinary waterline.	As above.
	[a]Grant a 10-foot right-of-way across 0.34 miles of Forest Service land for a 6-inch sewer line.	As above.
	Grant a electronic site permit for about 1 acre for communication repeater station.	As above.
Bureau of Reclamation	Agree to modification 130-foot wide of transmission line right-of-way across about 1 mile of withdrawal east of Utah Lake.	Reclamation Act 1902, 32 Stat. 388; 43 USC 371 et seq.
	Amend contract with Emery Water Conservancy District, UP&L, and the U.S. Bureau of Reclamation. (Subject to conditions of previous agreements to maintain fish habitat in affected reservoirs and streams.)	Colorado River Storage Project Act.
Federal Aviation Administration	Issue air space permit for the two additional 600 foot stacks at complex.	[d]Federal Aviation Act of 1958; 72 Stat. 749, 797, 49 USC 1347, 1501, 14 CFR Part 77.
Environmental Protection Agency	Issue national pollutant discharge elimination system permit for emergency discharge of excess mine water into Cottonwood Creek.	Clean Water Act of 1977, 86 Stat. 816, 884, 33 USC 1251, 1342, 40 CFR Part 130 as amended.

(Continued)

TABLE 1-12 (concluded)

Agency	Action	Authority
	Issue permit for water intake in Cottonwood Creek.	As above.
	Issue Prevention of Significant Deteriorations Permit for Units 3 and 4.	Clean Air Act, 42 USC 1701, as amended August, 1977.
U.S. Army Corps of Engineers[e]	Issue permit for placement of diversion structure in Cottonwood Creek.	Clean Water Act of 1977, 86 Stat 816, 884 33 USC 1251, 1344, as amended.

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[a] A total width of 190 feet for rights-of-way is shown. However, these five facilities would share a single common corridor and may occupy less than the 190 feet indicated.

[b] These laws authorize the Secretaries of Interior and Agriculture to grant rights-of-way and special-use permits.

[c] The law and executive order authorizes the Secretary of Interior to prescribe necessary rules and regulations for the mining of coal.

[d] This law gives regulatory authority to the Federal Aviation Administration to foster development and safety of civil aviation.

[e] This responsibility will be transfered to the States once they have an approved Section "208" planning system under the new 1977 Act, Section 208(b)(4)(A).

TABLE 1-13

State and County Authorizing Actions

Agency	Action	Authority
Utah Division of State Lands	Grant 130-foot right-of-way across about 6 miles of state land for a 345-kV transmission line.	Utah Code Annotated (UCA) 1953 as ammended 65-2-1.
	Grant a 20-foot right-of-way across 0.2 miles of state land for a 25-kV distribuition line with a telephone line underbuild.	As above.
	Grant 50-foot right-of-way across 0.2 miles of state land for a 35 foot wide paved two lane road.	As above.
	Grant a 10-foot right-of-way across 0.2 miles of state land for a 2 inch culinary waterline.	As above.
	Grant a 10-foot right-of-way across 0.2 miles of state land for a 6 inch sewer line.	As above.
Utah Department of Transportation	Issue encroachment permit for Cottonwood Creek pipeline along Utah Highway 57 for about 6 miles.	UCA 1953 as ammended 27-9-9 through 11.
	Issue permits for 16 state and federal highway crossings.	As above.
Utah State Division of Health, Environmental Health Services Branch.	Issue permits for each component part of complex as they relate to pollution production and control.	UCA 1953 as ammended, Chapters 24 through 26.

Continued

TABLE 1-13 (concluded)

Agency	Action	Authority
	Issue permits for solid waste disposal (fly ash, sludge, and garbage).	As above.
Utah Division of Oil, Gas, and Mining	Issue permits for surface facilities connected with the Cottonwood Portal mining operation.	UCA as ammended 40-8-1 through 23.
Carbon County	Issue a building permit.	Zoning Ordinances for Carbon County, Utah adapted 5/19/59 as amended--Art. 5, Ordinance #130.
Utah County	Issue a building permit.	Zoning Ordinances for Utah County, Utah; revised 1976, Section 4-3-48.

CHAPTER 2

DESCRIPTION OF THE ENVIRONMENT

CHAPTER 2
DESCRIPTION OF THE ENVIRONMENT

INTRODUCTION

Chapter 2 describes, in summary form, environmental components likely to be impacted by the proposed action. Discussions of environmental components are in terms of: 1) lands occupied and disturbed by the project and 2) an influence zone likely to be impacted by the work force and associated population. (The influence zone, shown on Figure 2-1, is defined as the area within about a 2-hour driving distance from Price, Utah.) Also included is a brief description of the region's future environment without the proposal.

The environment resulting from the construction of Units 1 and 2 are considered part of the existing situation.

CLIMATE

The climate of the Emery and Carbon county area is generally semiarid, characterized by low relative humidity, abundant sunshine, low to moderate precipitation, warm summers, and cold winters. Seasonal and daily variations in temperature can be extreme.

In the area of the generating complex, the average annual temperature is 46° Fahrenheit (F). July is the warmest month (average 70° F) and January the coldest (average 20° F). Wide daily temperature ranges are caused by relatively strong daytime warming and rapid nighttime cooling.

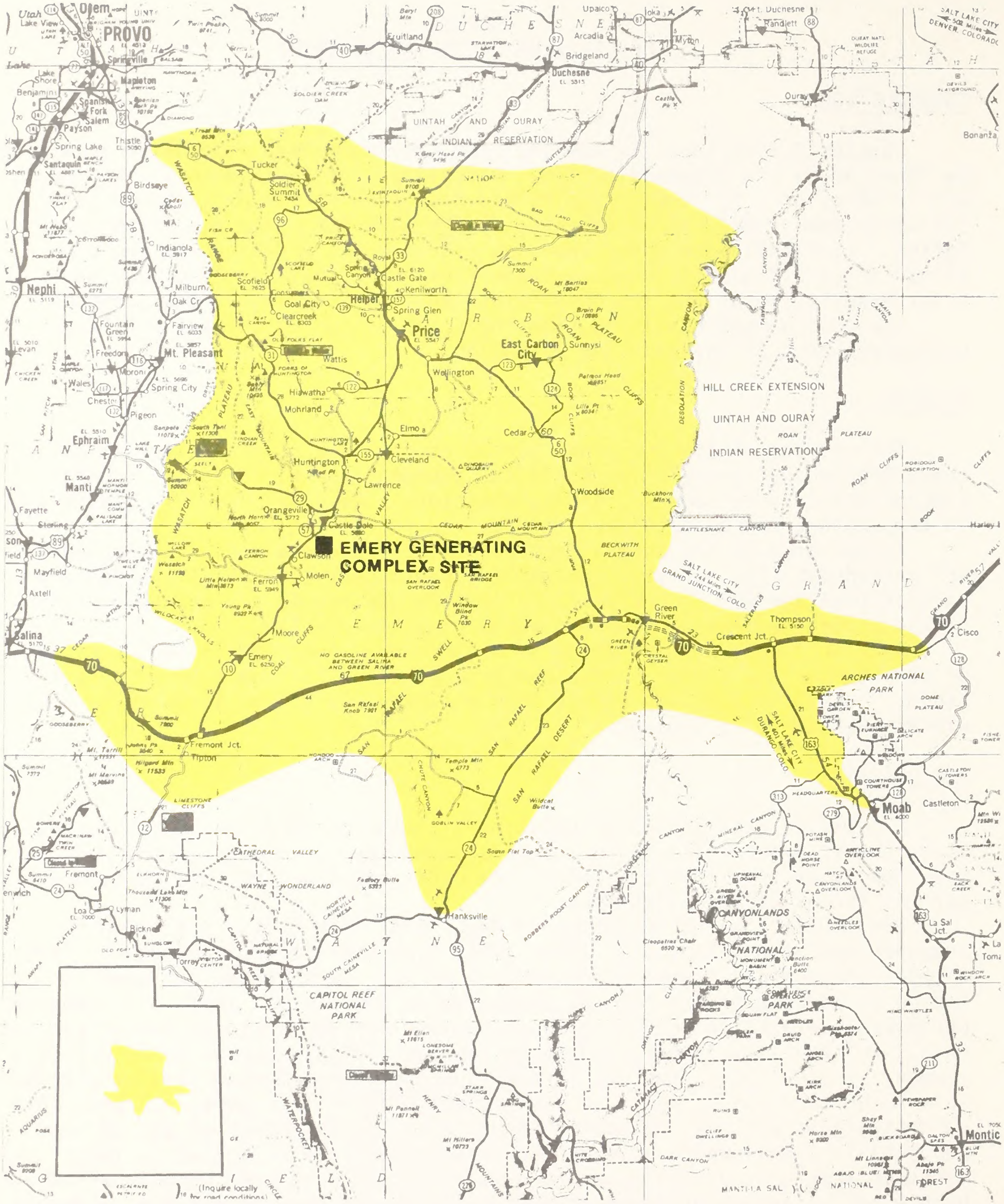
Average annual precipitation is 8.19 inches, occuring in two peak p eriods--summer and winter. Greatest precipitation is from summer thunderstorms. Relative humidity ranges from a summer average of 40 percent, to a winter average of 75 percent.

AIR QUALITY

A detailed description of existing air quality is in the Environmental Statement (ES) for Units 1 and 2 and is summarized here. Projected air quality impacts of the first two units, now under construction, are considered as part of the existing environment.

Emery Unit 1 began operating in May, 1978, with Unit 2 scheduled to commence operations in April, 1980. Unit 1 operated through February, 1979 without the use of scrubbers for removal of SO_2. A scrubber designed to remove 80 percent of the SO_2 was installed in May, 1979. Table 2-1 summaries monitoring data collected in the area during 1978 and includes the effects of Unit 1 (without a scrubber) and other sources. Also shown in Table 2-1 is a summary of modeling by the H.E. Cramer Company for estimated impacts attributable to Units 1 and 2, and does not include effects from other sources. All concentrations are well below the NAAOS, with the exception of the 24 hour particulate levels which exceeded the standard on two occasions in 1978. The excesses were most probably due to soil particles suspended during periods of high wind. A yellow atmospheric discoloration has been observed as a result of NO_x emissions from the Unit 1. The extent and frequency of occurrence has not been quantified.

All concentrations are well below the NAAQS, with the exception of the 24 hour particulate levels which exceeded the standard on 2 occasions in 1978. The excesses were most probably due to soil particles suspended during periods of high wind.



INFLUENCE ZONE

FIGURE 2-1

Model predictions and measured values for SO_2, NO_2, and particulates are compared in Table 2-1. Table 2-1 illustrates that, although observed 3 hour and 24 hour SO_2 concentrations with only Unit 1 operating were somewhat higher than would be expected by the modeling, there is reasonably good agreement. Calculated particulate concentrations were much lower than measured values. However, the predicted values by Cramer included only the particulate concentration from the Emery plant. Frequent occurrence of wind-blown dust would account for most of the particulate concentration. Measurements prior to the operation of Unit 1 support this assumption.

Trace Elements

Existing levels of trace elements are unknown. Concentrations are believed to be below detectable levels. No studies of trace element air concentrations have been conducted in the area.

Class I and BLM Areas of Special Interest

Figure 2-2 shows the three existing Class I areas which could be affected by the proposal. (Class I applies to areas in which practically any air quality degredation is considered significant.) In addition, five areas of special interest to the BLM in relation to air quality are shown. Four of these areas (Mexican Mountain, San Rafael Reef, Desolation Canyon, and the Lower Green River) are of special interest because of their potential for wilderness values and possible recommendation for redesignation as Class I air quality areas. The fifth area (Sids Mountain) is important because of its potential for wilderness values. At present, these areas are designated as Class II. (Class II applies to those areas in which air quality degredation, which accompanies moderate well-planned growth, would not be considered significant.) A principal reason for possible Class I redesignation would be to protect visibility in these scenic and isolated areas.

Visibility

Using airport visibility data, Trijonis (1978) has concluded that median visibility in nonurban areas of the southwestern United States is 65 to 80 miles. Baseline visual ranges for southeastern Utah were estimated by using visibility measurements made at Cedar Mountain (San Rafael Swell) and data collected at the Hanksville Airport. Based on these data, it is assumed that the average baseline visual ranges within Class I areas and BLM areas of special interest varies between 62 and 85 miles, depending on the time of year.

Fog during periods of light winds, precipitation during periods of moderate winds, and blowning dust during periods of strong winds can significantly reduce visual range, sometimes to 5 km or less.

GEOLOGY AND TOPOGRAPHY

Figure 2-3 shows major terrain features of the Carbon-Emery County area. The most prominent features are the high plateaus, especially the Wasatch Plateau and the front range of the Wasatch Mountains. Both the plateau and the mountains exceed 10,000 feet in elevation. There are are a number of valleys--Castle, Utah, Goshen, Cedar, Sevier, and Gunnison--which are characterized by relatively flat terrain, alluvial plains, benches, knolls, and

TABLE 2-1

Comparison of Maximum Measured Ground Level Concentrations, Air Quality Standards, and Modeled Concentrations

	Site and Concentrations ($\mu g/m^3$)								
	Castledale			Clawson				Cramer	
Pollutant	Pre-Unit 1[a]	Post Unit 1[b]	U-10[c]	Pre-Unit 1[d]	Post Unit 1[e]	Buzzard Bench[f]	NAAQS	1&2[g]	3&4[h]
SO_2									
Annual	<13	<13	--	4	2	--	80	3.5	13.2
24-hour	<13	52	42	34	31	16	365	26	73
3-hour	26	216	234	109	109	101	1,300	104	322
NO_2									
Annual	6	8	--	2	2	--	100	12.8	9.8
Particulates									
Annual	49	40	--	29[i]	19	--	60	0.7	0.5
24 hour[j]	665	170	--	167	34	--	150	4.8	2.7

[a] Monitored by the State of Utah, February-December, 1977.

[b] Monitored by the State of Utah, January-December, 1978.

[c] Monitored by NAWC, October-December, 1978.

[d] Monitored by North American Weather Consultants (NAWC) May, 1977 to April, 1978.

[e] Monitored by NAWC, May-December, 1978.

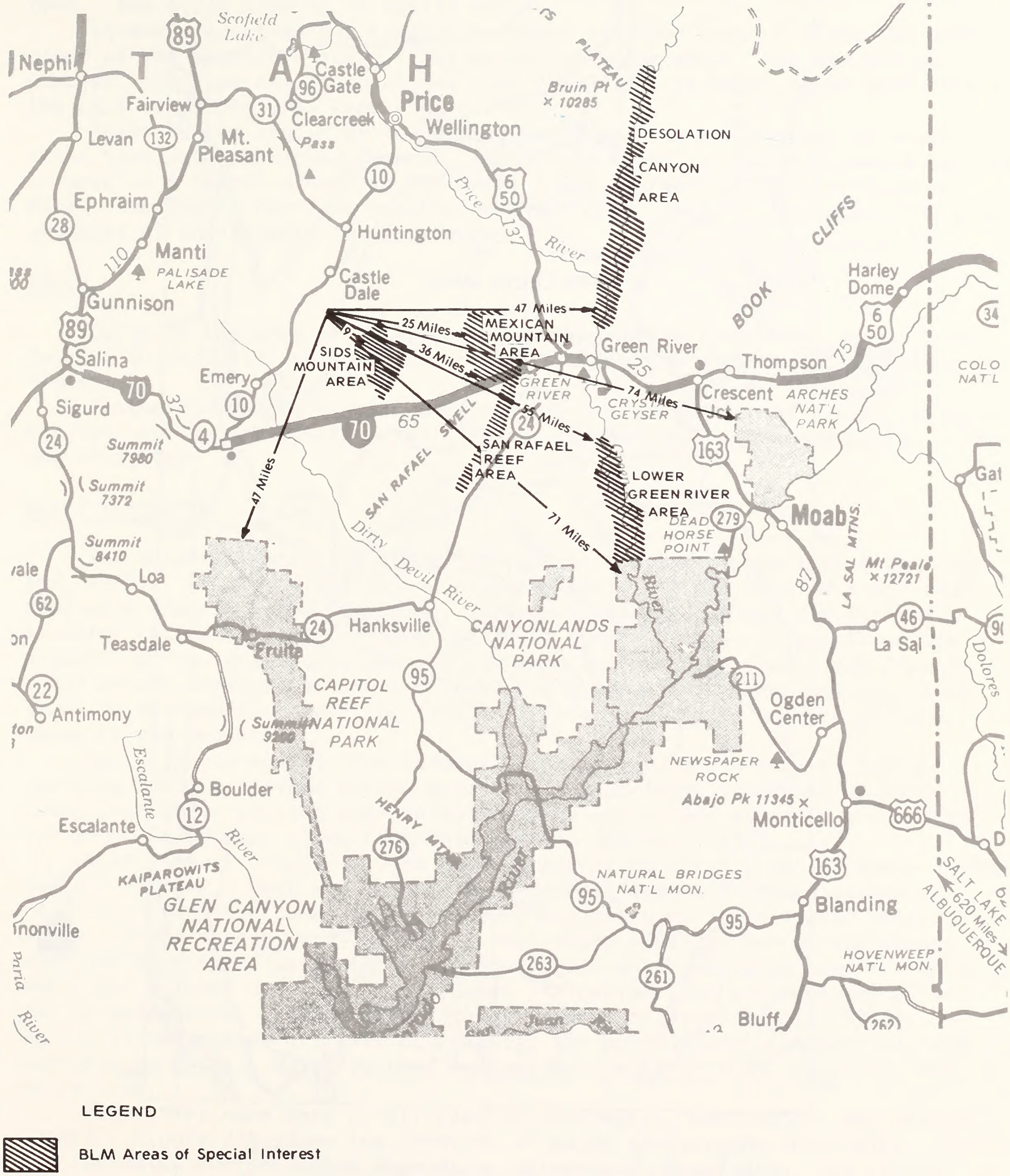
[f] Monitored by NAWC, October, 1978.

[g] Units 1 and 2 with scrubbers (80 percent SO_2 control) (Cramer, 1978[a]).

[h] Units 3 and 4 with scrubbers for SO_2 control.

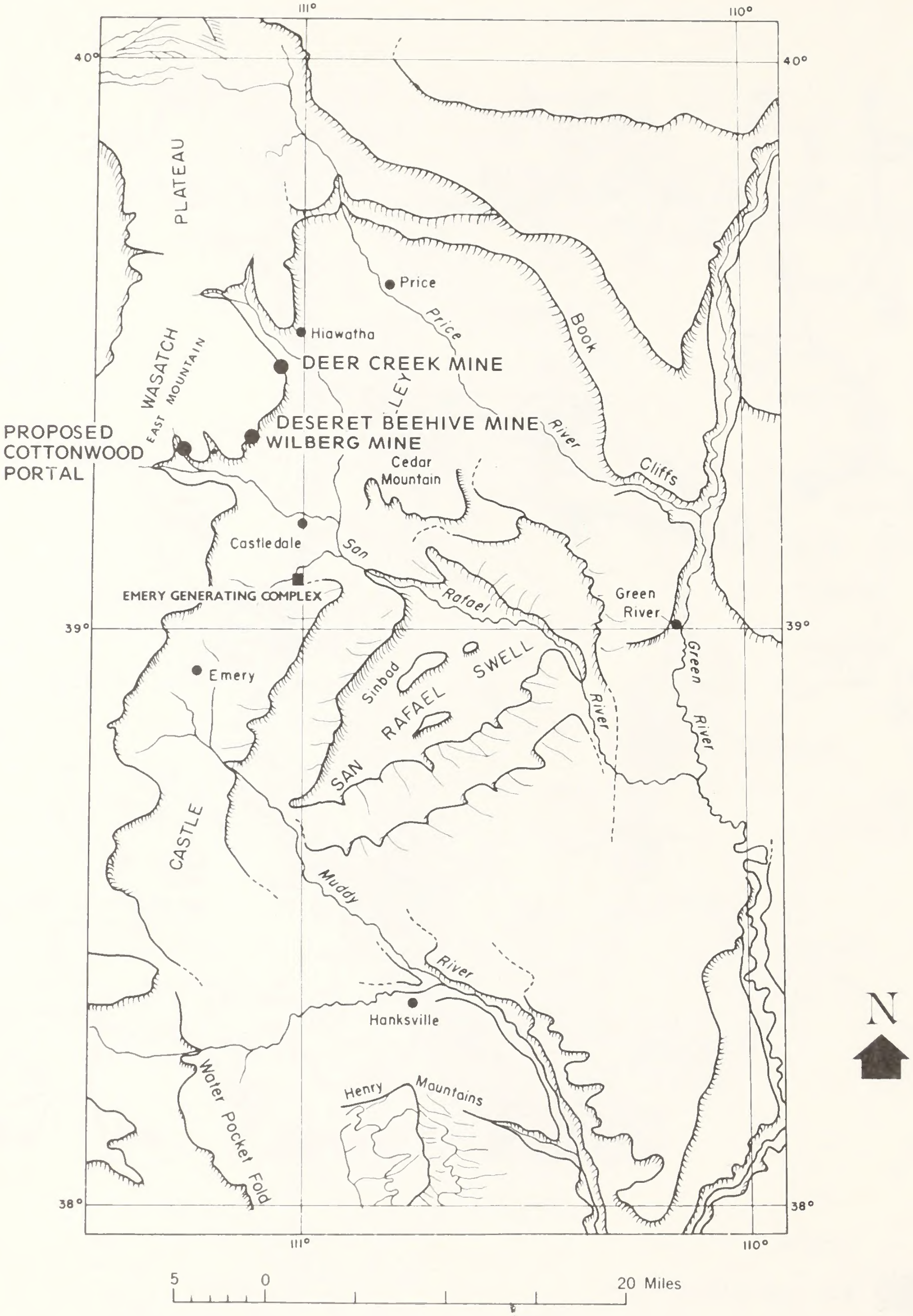
[i] Monitored by NAWC, January, 1974 to December, 1977.

[j] The primary standard was exceeded once in 1977 and the secondary standard was exceeded 4 times in 1977 and once in 1978.



CLASS I AREAS AND BLM AREAS OF SPECIAL CONCERN

FIGURE 2-2



MAJOR TERRAIN FEATURES

FIGURE 2-3

rolling hills. The elevations of these valleys range from 4,500 to 6,000 feet. The plant site is in Castle Valley.

Stream dissection has created a number of steep canyons along the east slope of the Wasatch Plateau (East Mountain) under which lies the mining complex. Surface elevation ranges from 7,250 feet to about 9,600 feet within the coal leasehold area (see Figure 1-9).

Areas in the region are subsiding where coal is being mined or where mines have been abandoned (Dunrud, 1975). No known surface subsidence has yet occured as a result of mining for Units 1 and 2 or at the Deseret-Beehive Mine. Subsidence could be expected however (USDI, 1977). Appendix II-1 gives examples of the effects of subsidence.

??

SOILS

Soils in the area of the proposed project range from deep, highly productive to erodible, shallow, and rocky. Figure 2-4 shows soil type locations.

Productive mountain soils are suitable for production of forage, wildlife habitat, and wood products. Small areas, between Huntington and Emery, Utah, are irrigated.

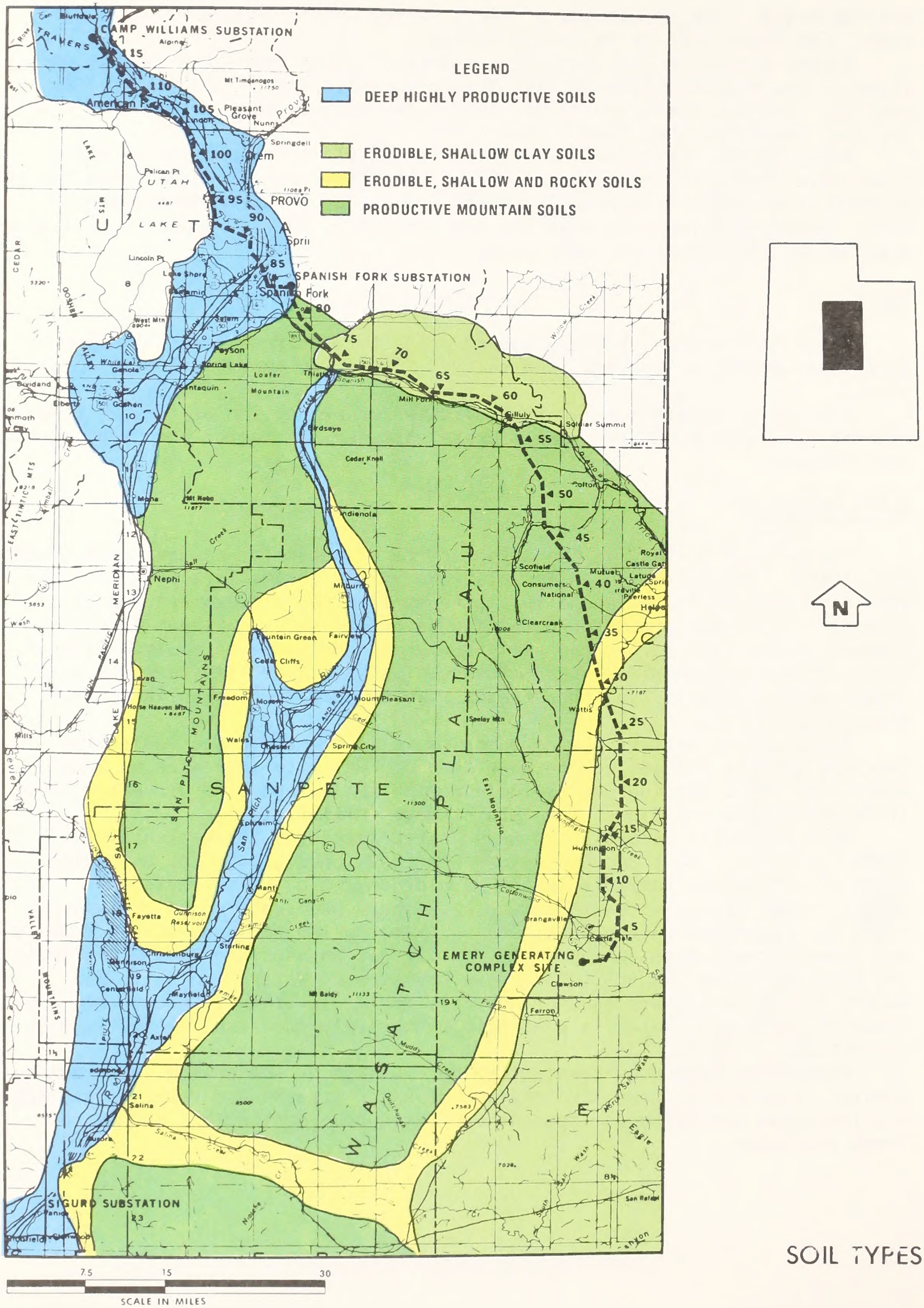
WATER RESOURCES

The Wasatch Plateau is the major source of water for central Utah (Jeppson, 1968). Precipitation on the plateau, mostly in the form of snow, averages more than 20 inches annually. Streams from the plateau are typically snow-fed resulting in great fluctuation of runoff rates. Stream flows are highest during late spring and early summer and decrease to minimum flow in early autumn through mid-winter. Numerous springs from limestone and sandstone formations also feed the streams. Water quality is good in streams above canyon mouths.

Below canyon mouths, the hardness, alkalinity, and dissolved solids increase and the streams become more turbid. Salinity increases as water evaporates while passing over soluble marine shales and as drain water from irrigated farm lands flows back into streams (Millar, 1975).

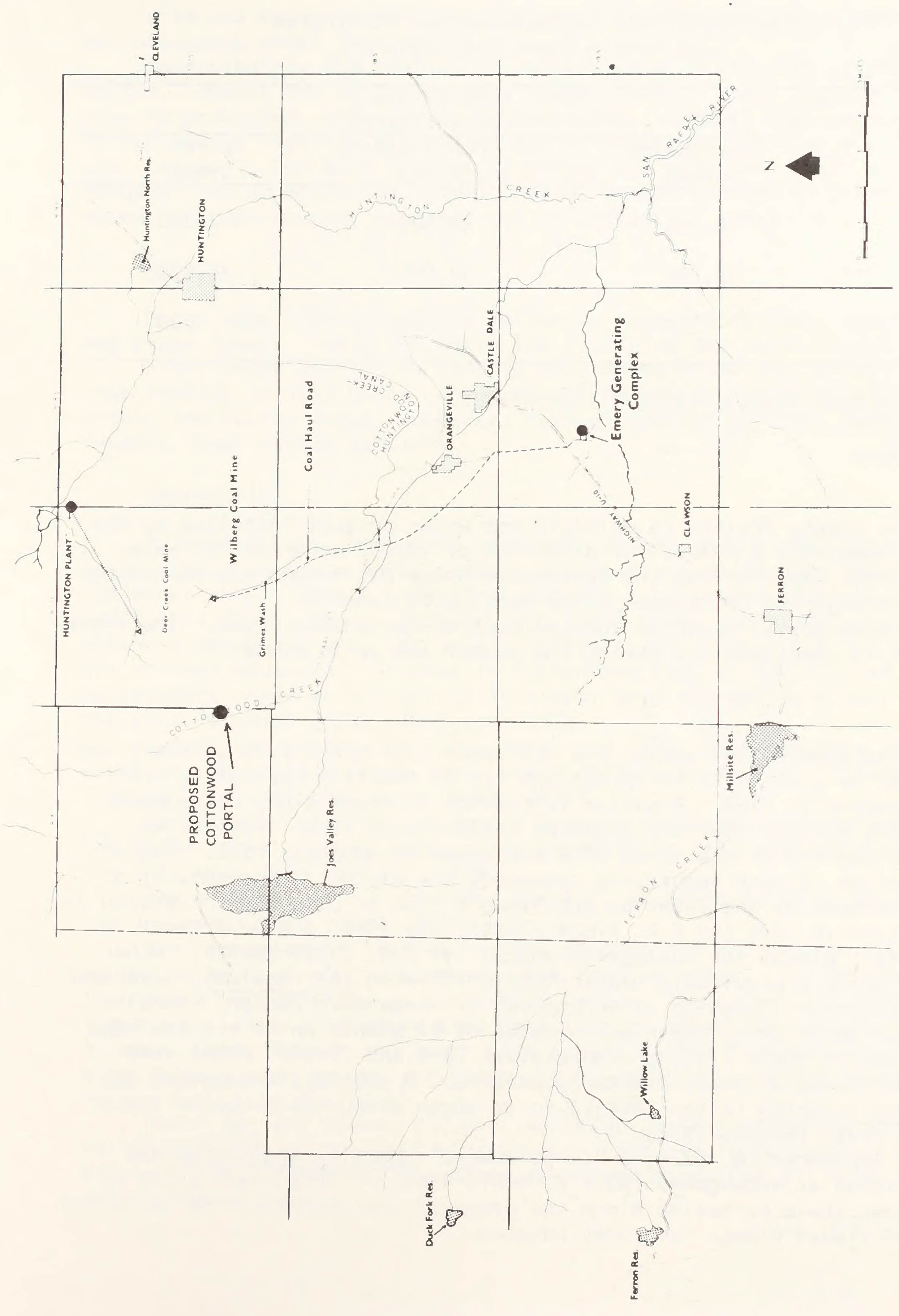
Most waters in central Utah were appropriated for irrigation early in the State's history. Most appropriations were developed within the governing rules of irrigation companies which were organized by consolidated water users. Water shares were issued and each share provides for an equivalent right to a quota of water (USBR, 1961). Water which would be used for Units 3 and 4 has already been appropriated for irrigation uses and does not affect the Colorado River compact (Utah State Division of Water Rights, 1976). Waters in the region are used principally for agricultural, industrial, and domestic purposes. Water is used nonconsumptively for fish, wildlife, and recreation.

Reservoirs have been constructed on Huntington, Cottonwood, and Ferron Creeks. Figure 2-5 shows the location of major streams and reservoirs. Table 2-2 indicates current water demands on Cottonwood, Huntington, and Ferron Creek drainages.



SOIL TYPES

FIGURE 2-4



MAJOR STREAMS AND RESERVOIRS

FIGURE 2-5

TABLE 2-2

Current Water Use for Cottonwood, Huntington and Ferron Creek Drainages

Water Demand	Water Use (acre-ft/yr)[a] Cottonwood Creek	Huntington Creek	Ferron Creek
Industrial	14,000	15,500	7,000
Agricultural	32,000	92,000	16,800
Domestic	220	350	130

Source: VTN, 1975; Hansen, 1978; Millar, 1978.

[a] Annual Averages.

The Emery County Project (a multiple use water project installed by the Bureau of Reclamation) provides for diversion of 16,687 acre-feet of water annually (average amount) from the Cottonwood Creek Basin into the Huntington Creek Basin through the Cottonwood Creek-Huntington Canal.

The new mine portal would be located next to Cottonwood Creek. The creek at this point is sometimes dry during the summer and early winter.

VEGETATION

Vegetative communities within the influence zone range from saltbush and greasewood at the plant site to spruce and fir on mountain tops along the proposed transmission line. Riparian vegetation is found along Cottonwood Creek and along streams near the proposed transmission line. Vegetative communities along the transmission line are shown in Appendix II-2. Representative species of each vegetative community are listed in Appendix II-3.

The Department of the Interior published a list of possibly threatened or endangered flora in 1975 (40 F.R. 27824-27924). In 1976, the Department proposed certain plants for endangered status (41 F.R. 24524-24572). Other species, including a previously undescribed milk vetch (Astragalus), have been recommended for classification as endangered or threatened (Welsh, 1978a). Within the influence zone, there are a total of 47 plants which are included in at least one of these listings (Appendixes II-4 and II-5). Final rule making on the status of these plants is pending. A possibly endangered species, Townsendia aprica (aster family) could occur along the proposed transmission line route (Welsh, 1978).

On September 28, 1978, a "scorpionweed" Phacelia argillacea was officially listed as endangered (43 F.R. 44810-44812). This plant grows on the Green River Shale Formation along the proposed transmission line route and only nine individual plants have been counted.

ANIMAL LIFE

Wild and feral animals are discussed in this section. Domestic livestock are discussed under land use.

Approximately 368 species of vertebrate wildlife, 279 of which are protected, inhabit the influence zone (UDWR, 1978). These include 20 fish species (2 protected, endangered; 12 protected, nongame; and 6 protected, game), 23 species of reptiles and amphibians (1 protected, nongame and 22 unprotected, nongame), 244 bird species (2 protected, endangered; 203 protected, nongame; and 38 protected, game), and 80 mammal species (1 protected, endangered; 66 unprotected, nongame; and 13 protected, game).

Aquatic

Major game fish within the influence zone are rainbow, cutthroat, brown, and brook trout. Table 2-3 lists the fisheries and their status.

Since water quality is reduced as streams enter the valley floor, game fish habitat is lost below canyon mouths on Cottonwood Creek, Huntington Creek, and Ferron Creek. However, several species of fish, mainly minnows, inhabit lower stream sections.

Terrestrial

Mule deer, elk, pronghorn antelope, upland game birds, waterfowl, cottontail rabbit, snowshoe hare, cougar, and bear are major game species in the influence zone. Upland game birds include ring-necked pheasants, chukars, California quail, mourning doves, and sage, blue, and ruffed grouse. Pheasants are dependant upon the area's agricultural lands. Elk and deer summer on all of East Mountain. Studies in Cottonwood Canyon, location of proposed coal development, show an average of 17.4 deer days use per acre each winter for the past 10 years (UDWR, 1971 and 1977).

During the winters of 1973, 1974, and 1978, 45 moose were released in the Lower and Upper Fish Creek areas near Scofield Reservoir. Illegal killing has limited growth of this herd (UDWR, 1978).

In December of 1978, 12 desert bighorn sheep were transplanted into the San Rafael area. These animals are expected to fill available habitat within the influence zone (Briggs, 1979).

The river otter, an uncommon species, is believed to be present within the influence zone (UDWR, 1976).

The transmission line would pass through elk and deer winter and summer ranges as well as elk calving and deer fawning areas. An important known fawning-calving area is in Starvation Canyon. Appendix II-2 shows general locations. (The line would also pass through essential moose winter range at Soldier, Jump, Beaver and Lower Fish Creeks.) The transmission line would also cross a sage grouse strutting ground north of Scofield Reservoir in Dry Valley (see Appendix II-2).

Provo Bay and Powell Slough, important nesting areas for waterfowl and marshland birds on the east side of Utah Lake, would be crossed by the transmission line. Waterfowl and other marshland birds use all open water areas of the influence zone.

TABLE 2-3

Status of Fisheries

Fishery	Status
Lakes and Reservoirs	
Benches Pond, Boulger Res., Cove Lake, Emerald Lake, Gooseberry Res., Marys Lake, Soup Bowl, and Snow Lake	Stocked with rainbow trout catchables.
Joes Valley Res., Millsite Res., and Scofield Res.	Stocked with rainbow trout fingerlings.
Red Pine 1 and 2 and Pete's Hole.	Stocked with rainbow trout catchables and cuttroat trout fry.
Blue Lake, Grassy Lake, Wrigley Springs Res., and Willow Lake.	Stocked with rainbow trout catchables and brook trout fingerlings.
Ferron Reservoir and Millers Flat.	Stocked with rainbow trout catchables and fingerlings.
Electric Lake	Stocked with cutthroat trout fry.
Acadamy Mill Res., Blue Lake, and Doc's Lake	Stocked with brook trout fingerlings.
Huntington North Reservoir	Stocked with rainbow trout catchables and largemouth bass.
Cleveland Res. and Duck Fork Res.	Presently dewatered while dams are being repaired. Will be stocked with rainbow trout when completed.
Streams	
White River, Pondtown Creek, Gooseberry Creek, "C" Canyon Creek, Silver Creek, Clear Creek, Upper Fish Creek, Seely Creek, Indian Creek, Ferron Creek (above canyon mouth), Paradise Creek, Lowry Creek, Scad Valley Creek, Boulger Creek, Left Fork Huntington Creek, and Huntington Creek (above Electric Lake).	Natural reproduction of cutthroat trout.
Huntington Creek (above canyon mouth)	Stocked with rainbow trout catchables and brown trout fingerlings. Good reproduction of brown trout below Electric Lake.
Cottonwood Creek (above canyon mouth)	Stocked with brown trout fingerlings and Snake River cutthroat trout.
Lower Fish Creek (Price River)	Stocked with brown trout fingerlings. Good brown trout reproduction.

Wild Horses and Burros

Three herds of wild horses (about 49 animals) and two herds of wild burros (about 24 animals) are on the San Rafael Swell and adjacent areas (Rowley, 1978).

Threatened and Endangered Wildlife

The American peregrine falcon and bald eagle, protected by the Endangered Species Act (1973, 87 Stat. 884), are the only known endangered animals in the area. Several unconfirmed sightings of the endangered black-footed ferret have been reported in the vicinity of the towns of Green River, Ferron, and Woodside (UDWR, 1977).

Peregrine falcons have been sighted near Utah Lake and in the influence zone (Boner and Heggen, 1977; Eyre, 1976). An active eyrie is believed to exist in Emery County (UDWR, 1978). Bald eagles winter along much of the transmission corridor in Gordon Creek and Spanish Fork Canyon. Several other wintering areas are in the influence zone.

The proposed threatened razorback sucker and proposed endangered bony tail chub, as well as, the endangered Colorao River squawfish and humpback chub are found in the Green River within the influence zone.

CULTURAL AND PALEONTOLOGICAL RESOURCES

Cultural (Prehistoric and Historic) Resources

Six archaeological sites have been identified within the transmission line corridor (see Appendix II-2). Consultation with the Utah State Historic Preservation Officer has verified that none of these sites meet National Register of Historic Places eligibility criteria (Dykman, 1978). No archaeological sites, prehistoric or historic, are located at the plant site (Berge, 1978). Areas which would be disturbed by other project components contain no sites that are eligible for nomination to the National Register of Historic Places.

A large and varied cultural resource base is known to exist in the influence zone (Sargent, 1977). Several sites in this zone are listed on or have been nominated to the National Register of Historic Places. The Utah State Register of Historic Sites also lists cultural values in the zone.

Paleontological

Fossil-bearing formations of varying paleontological value are found in all geologic formations that might be impacted by the proposed action (Miller, 1978a). The two most important are the Green River Formation and North Horn Formation (Miller, 1978b). The Green River Formation is one of the richest fossil-bearing formations along the proposed transmission line. The formation provides a continuous fossil record of the period when dinosaurs were becoming extinct and mammals were becoming the dominant land animals (Stokes and Cohenour, 1956). The North Horn Formation, also exposed along the proposed transmission line route, is one of the few formations in North America that represents continuous nonmarine deposition from the Mesozoic to Cenozoic eras (Miller, 1978b).

SCENIC RESOURCES

The generating complex is within a flat, desert valley in the foreground visual zone in an area of Class C scenery and medium sensitivity. (See Appendix II-6 for definition of terms.) The complex is near Highway U-10 which is traveled by 820 vehicles daily. Present man-made contrast is high due to the presence of Unit 1 and construction of Unit 2.

The scenery within the influence zone includes the scenic Wasatch Plateau and the dramatically sculptured canyon country on the San Rafael Swell. The complex can be viewed from areas of Class A scenery in both areas and from an I-70 rest area on the San Rafael Swell.

Areas classified as Class I air quality and areas of special interest include Capitol Reef National Park, Canyonlands National Park, Arches National Park, Desolation Canyon, the Lower Green River, and the entire San Rafael Swell including Sids Mountain, Mexican Mountain, and the San Rafael Reef. All have outstanding scenic qualities. The Swell area offers unusual vistas with visibility extending from 62 to 85 miles.

Visual zones, scenic quality, sensitivity levels, and present man-made contrast at all proposed component locations, except for the transmission line, are shown on Table 2-4. Information for the transmission line is shown in Appendix II-2. Information for the six transmission line highway crossings (where additional towers would be erected) is shown on Table 2-5.

MINERALS

Utah Power and Light (UP&L) controls approximately 323 million tons of the estimated 800 million tons of coal on East Mountain. Of the reserves controlled by UP&L, about 190 million tons are recoverable. The entire Wasatch Plateau coal field coal reserves are estimated at approximately 6.4 billion tons (Doelling, 1972). Deposits of leasable coal are located up canyon from the Cottonwood portal.

LAND USES

Agriculture and Livestock Grazing

There are 35,693 acres of irrigated land in Emery County--1.3 percent of the county's area. Principal crops are alfalfa and small grains. The average annual yield is approximately 3 tons of alfalfa or 54 bushels of barley or oats per acre (Utah Agricultural Statistics, 1977).

Cattle and calves on farms number approximately 28,000 head and sheep and lambs number approximately 12,000 (Utah Agricultural Statistics, 1977). Locations of the irrigated, grazing, and forest lands in Emery County are shown in Figure 2-6.

There are no unique farmlands in Carbon and Emery counties. Prime farmlands are found throughout the two county area as well as farmlands which have agricultural importance at the state level (SCS, 1978). Appendix II-7 contains a definition of these three land catagories.

Recreation

Nearly all land in the influence zone is used for extensive outdoor recreation (e.g., hunting, fishing, sightseeing, and off-road vehicle use). Developed recreation sites and their use during 1977 are shown in Table 2-6.

TABLE 2-4

Present Visual Resource Conditions[a] at Project Areas (Exclusive of Transmission Line)

Project Component	Present Contrast	Scenic Quality	Visual Sensitivity	Visual Zones
Generating Station	High	C	Medium	FMg
Cottonwood Portal	High	B	Medium	FMg
Coal Conveyor	Low	B	Medium	FMg
Coal Haul Road				
a. From Cottonwood Canyon to Swasey Diversion.	High	B	Medium	FMg
b. From Swasey Diversion to plant Site	High	C	Medium	FMg
Water Diversion and Pipeline	High	C	Medium	FMg

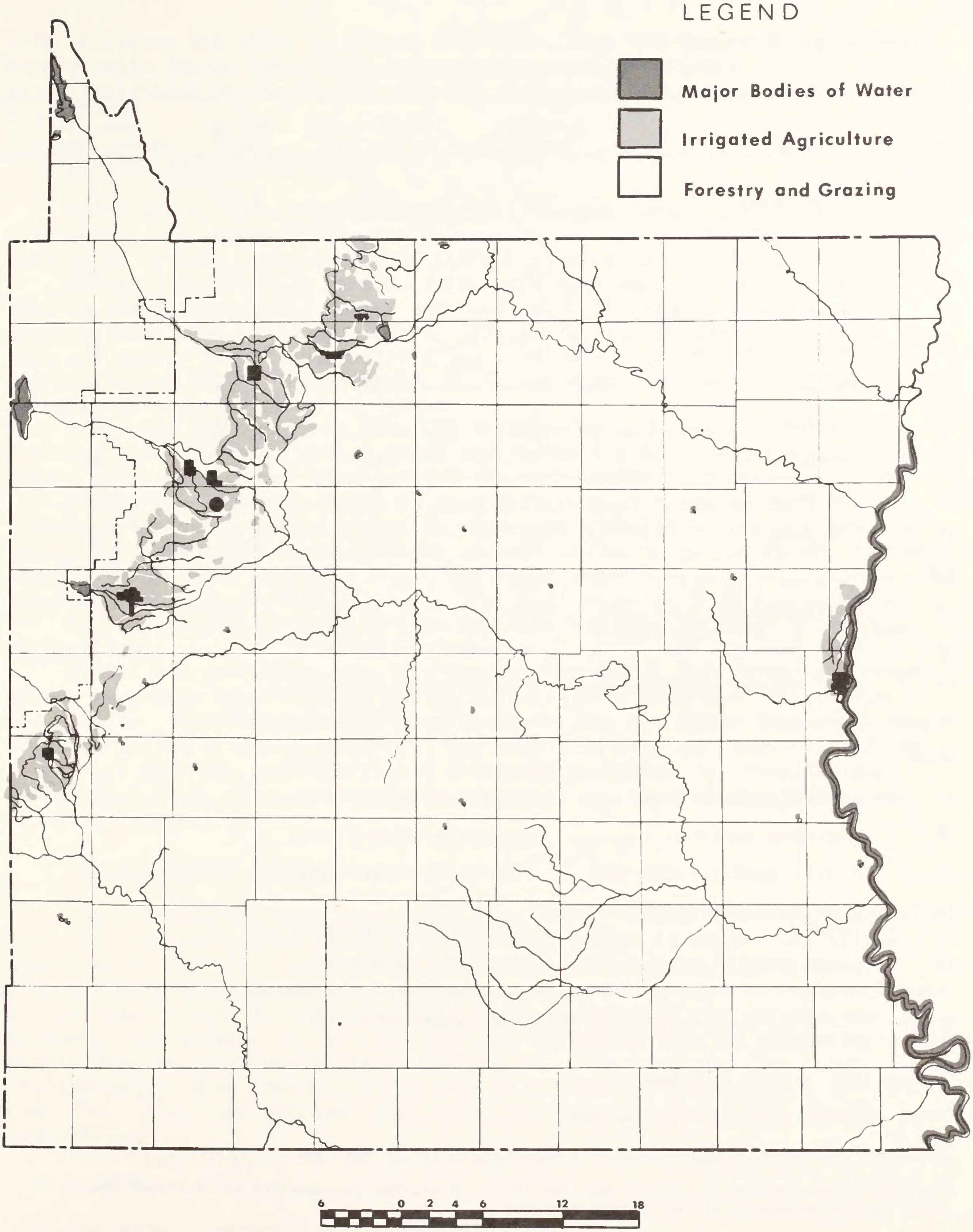
[a] Appendix II-6 defines terms used in this table.

TABLE 2-5

Transmission Line Highway Crossings
Where Additional Towers Would Be Erected

Highway	Transmission Line Milepost	Average Daily Traffic[a]	Present Man-Made Contrast
U-10	8	1,180	High
U-31	16	430	High
U-122	26	70	High
U-50	28	unknown	High
U-96	50	345	High
US 50 and 6	58	3,210	High

Source: [a] Utah Traffic Volume Map, 1975.



EMERY COUNTY EXISTING LAND USE

FIGURE 2-6

TABLE 2-6

Recreation Use on Selected Sites

Map No.[a]	Site	Length of Season[b]	Number Persons at One Time[c]	Visitor Days[d]	Percent of Theoretical Maximum Capacity[e]
Forest Service					
1	Ferron Canyon	149	125	4,000	11
2	Ferron Reservoir	93	175	18,800	58
3	Joes Valley	118	240	20,600	36
4	Indian Creek	87	450	5,900	8
5	Forks of Huntington	107	65	7,800	57
6	Old Folks Flat	107	150	14,900	46
7	Flat Canyon	93	130	27,600	114
8	Gooseberry	93	100	10,800	58
9	Fish Creek	87	25	2,200	50
10	Avintaquin	108	135	6,500	22
BLM					
11	Dinosaur Quarry	183	50	400	2
12	Price Recreation Area	Information not available.			
13	Cedar Mountain Recreation Area	Information not available.			
14	San Rafael	Information not available.			
STATE					
15	Scofield Reservoir Park	Information not available.			
16	Huntington State Park	Information not available.			
17	Millsite Reservoir State Park	Information not available.			
18	Green River State Recreation Area	Information not available.			
19.	Goblin Valley State Reserve	Information not available.			

Source: U.S. Forest Service and Bureau of Land Management Recreation Use Reports, 1977.

[a] Numbers refer to sites in Figure 2-7.

[b] Number of days a year a site can be used.

[c] Indicates the number of persons the site was designed for at one time.

[d] Recreation use reported in visitor days for 1977. (A visitor day consists of 12 visitor hours which may be aggregated by one or more persons).

[e] Statistical sampling indicates that the use of well-managed sites falls between 20 and 40 percent of capacity. Well-managed sites are sites not showing signs of deterioration from overuse.

Site locations are shown on Figure 2-7. Six sites are presently being used beyond their design capacities (use greater than 40 percent). Public recreation facilities in the cities near the generating complex are listed in Table 2-7.

Special Designation Areas

There are no officially designated wilderness areas, primitive areas, or wild and scenic rivers within the influence zone. Link Flat (BLM) is the only designated natural area, and is an Instant Study Area for wilderness review.

United States Forest Service lands were evaluated for wilderness potential in the Roadless Area Review and Evaluation II (RARE II). All Forest Service lands that would be directly affected by the proposed facilities or that are within the secondary influence zone were recommended for non-wilderness in the RARE II Final Environmental Statement and are no longer undergoing wilderness review (USFS, 1979).

BLM lands that would be directly affected by proposed facilities were reviewed for wilderness values, were determined not to have wilderness character, and are no longer undergoing wilderness review (see Appendix II-8).

Within the influence zone, 25 roadless areas of 5,000 acres or larger (roadless inventory units) of public lands administered by the BLM are presently being reviewed for wilderness values. Units under review are listed on Table 2-8 and shown on Figure 2-8. BLM lands under review are subject to interim management protection (i.e., they will be managed in a manner that will not impair any suitability they may have for Congressional wilderness designation).

Within the influence zone, portions of the Muddy, San Rafael and Green Rivers have been identified as having potential for wild and scenic river designation. Sids Mountain, Mexican Mountain, and the Hondu-Muddy area have been identified as having potential for Primitive Area designation, and the San Rafael Reef has been identified as having potential for natural area designation (BLM, 1978). Areas with potential for special designation are shown on Figure 2-8.

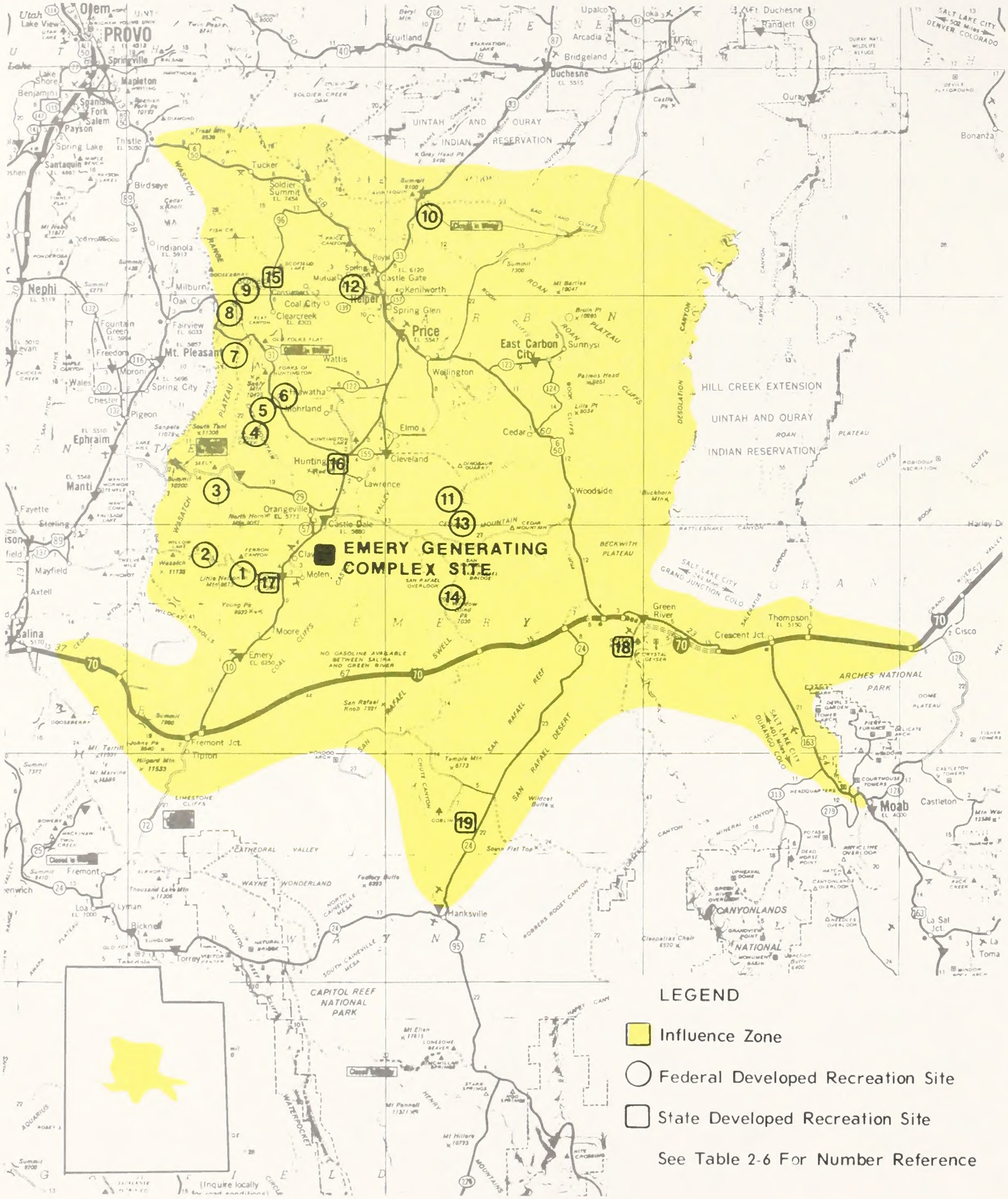
Transportation Systems

The Cottonwood Canyon road (USFS Road 50040) is a single lane road with turn-outs and the primary access road for recreation in Upper Joes Valley. According to officials of the Manti-LaSal National Forest, this road will probably be reconstructed as a two-lane paved facility over its entire length at some time in the future. The road was traveled by 5,218 vehicles during September and October of 1977 and the USFS estimates that in excess of 20,000 people used the road during those two months. The road provides access to the Trail Mountain Mine (coal). It is used as a stock driveway for up to 1,880 cows plus calves and 600 ewes plus lambs and provides access for mineral exploration.

Utah State Highway 29 has an average daily traffic volume of 190 vehicles (UDOT, 1975).

LAND USE PLANS, CONTROLS AND CONSTRAINTS

Resources associated with federal lands in central Utah (including the counties of Emery, Carbon, Sevier, Sanpete, Juab, and Utah) are managed under policies and guidelines of Management Framework Plans, developed by the BLM,



INFLUENCE ZONE WITH DEVELOPED RECREATION SITES

FIGURE 2-7

TABLE 2-7

Public Recreation Facilities

	Parks	Swimming Pool	Tennis	Golf
Carbon County				
E. Carbon	x	0	0	0
Helper	x	x	x	0
Price	x	x	x	x
Emery County				
Castle Dale	x	x	x	0
Ferron	x	0	x	0
Green River	x	0	x	0
Huntington	x	0	x	0
Orangeville	x	0	0	0

Source: Wistisen, 1978.

x = available
0 = not available.

TABLE 2-8

BLM Roadless Inventory Units Presently Undergoing Wilderness Review

Unit	Inventory Recommendation[a]
UT-060-007	1
UT-060-010	2
UT-060-011	2
UT-060-012	2
UT-060-013	2
UT-060-014	2
UT-060-015	2
UT-060-023	3
UT-060-025	3
UT-060-026	3
UT-060-028	3
UT-060-029 A	3
UT-060-053	3
UT-060-054	3
UT-060-067	3
UT-060-068	3
UT-060-069	3
UT-060-070	3
UT-060-072	3
UT-060-075	3
UT-060-076	3
UT-060-077	3
UT-080-612	3
UT-080-615	3
UT-080-616	3

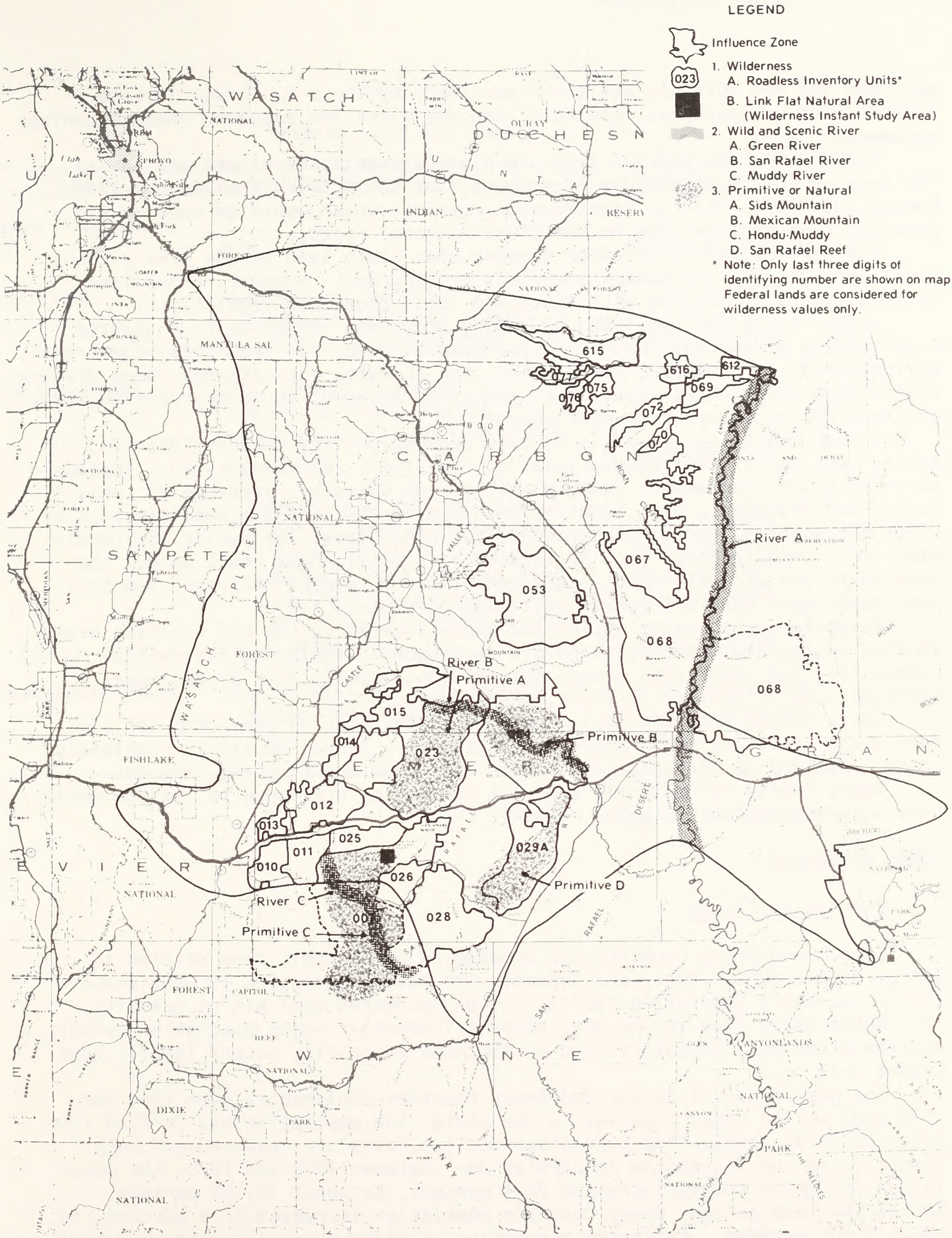
Source: BLM Wilderness Inventory, 1979 and IPP Accelerated Wilderness Inventory, 1979.

[a] Inventory Recommendation:

1. Of 150,930 total acres within this unit, 40,000 acres appear to have wilderness character and have been recommended for Wilderness Study Area (WSA) status. The remainder of the unit appears to lack wilderness character and has been recommended for exclusion from further wilderness review.

2. The unit appears to lack wilderness character and has been recommended for exclusion from further wilderness review.

3. The unit may possibly have wilderness character, and has been recommended for more intensive inventory.



AREAS WITH POTENTIAL FOR SPECIAL DESIGNATION

FIGURE 2-8

and Land Use and Multiple Use Plans developed by the U.S. Forest Service. Federal land use policies, controls, and decisions are based on these planning documents.

Table 2-9 lists federal land use plans presently developed and in use. The Spanish Fork Multiple Use Plan identifies the Spanish Fork-Rays Valley Energy and Public Utility transmission corridor which would be used by the proposed transmission line on the Uinta National Forest.

The State Division of Lands manages Utah State land in the area without comprehensive land use management plans or programs. However, state land actions generally conform with state and local codes and regulations.

County lands are regulated by zoning programs. Counties have adopted local zoning ordinances which describe general areas for industrial-commercial, agricultural, agricultural-residential, and forestry-recreational-range development. Some residential areas have been zoned adjacent to unincorporated towns and in areas of summer home development.

Carbon County has recently revised regulations for subdivisions and mobile home parks. For conventional subdivisions, improvements must include streets, travel easements, sewer mains, sewage disposal, water mains, reservoirs, and drainage ways. Subdivision planning must include consideration of sites for schools, parks, playgrounds, and other areas for public use (Ordinance 118). Mobile homes must be located in a mobile home court unless the home meets the more stringent requirements for permanent housing. A mobile home court must have all public utilities (Ordinance 112).

Essentially all major cities and towns located in the six counties have adopted zoning ordinances to regulate development (including residential, commercial, and industrial areas; subdivisions; mobile home areas; water services; public utility services; and streets).

Emery County passed a zoning resolution (ordinance) providing for six zone classifications and a Board of Adjustment. Carbon County is completely zoned. Table 2-10 lists the status of local land use planning programs.

Emery County is presently revising its zoning ordinance to include mobile home park regulations (Stanton, 1974).

HUMAN RESOURCES

Population Trends

Carbon and Emery counties are undergoing an economic boom related to energy development. Major developments are the construction of UP&L's Huntington and Emery generating facilities and increased coal mining activity. The Carbon-Emery area is somewhat removed from other major population centers and therefore most of the related socioeconomic activity occurs locally (see Figure 2-1).

The population of Carbon and Emery counties declined between 1960 and 1970 and, unlike other counties in the state, the population has shifted from urban to rural areas. The population decline has since reversed and both counties are now increasing in population. Between 1970 and 1976, the population of Carbon County increased 22.1 percent, to about 19,100 persons. During the same period, Emery County's population increased 47.9 percent, to about 7,600 persons. Estimated population of major communities in 1970 and 1975 is shown in Table 2-11.

Between 1970 and 1976, there has been net in-migration of 2,500 people into Carbon County and 2,000 people in Emery County. These in-migrants account for 26 percent of Emery County's total population and 13 percent of Carbon County's population.

TABLE 2-9

Federal Land Use Plans

Plan	Government Entity	Status
Management Framework Plans	BLM	Prepared 1968-1975
Land Use Plans	U.S. Forest Service Fishlake National Forest Salina Land Use Plan	Prepared 1975
Multiple Use Plans	U.S. Forest Service Uinta National Forest Spanish Fork Multiple Use Plan	Revised 1978
	Manti-LaSal National Forest	
	Ferron Multiple Use Plan	Revised 1974
	Manti Multiple Use Plan	Revised 1974
	Ephraim Multiple Use Plan	Revised 1974
	Castle Dale Multiple Use Plan	Revised 1974
	Mt. Pleasant Multiple Use Plan	Revised 1974
Land Management Plans	Manti-LaSal National Forest Ferron-Price Land Management Plan	Draft scheduled to be released August, 1979.

TABLE 2-10

Status of Local Land Use Planning Programs
1976

Jurisdiction	Planning Commission Created	Planning Commission Active	Land Use Plan Prepared	Land Use Plan Adopted	Zoning Ordinances Adopted	Subdivision Regulation Adopted
Carbon County	yes	yes	yes	yes	yes	yes
Price	yes	yes	yes	no	yes	yes
Helper	yes	yes	yes	no	yes	yes
Wellington	yes	yes	yes	yes	yes	no
East Carbon	yes	yes	yes	yes	yes	yes
Sunnyside	no	no	no	no	no	no
Hiawatha	no	no	no	no	no	no
Scofield	no	no	no	no	no	no
Emery County	yes	yes	yes	yes	yes	yes
Elmo	no	no	yes	no	no	no
Cleveland	yes	yes	yes	no	yes	yes
Huntington	yes	yes	yes	yes	yes	yes
Castle Dale	yes	yes	yes	yes	yes	yes
Orangeville	yes	yes	yes	yes	yes	yes
Ferron	yes	yes	yes	no	yes	yes
Emery	yes	no	yes	yes	yes	no
Green River	yes	yes	yes	no	yes	yes

Sources: Southeastern Utah 208 Plan
Despain and Despain Consulting Planners.

TABLE 2-11

Population of Counties and Representative Communities

Town	Population 1970	 1975	Percent Increase
Carbon County	15,647	18,044	15
Helper	1,964	2,198	12
Price	6,128	7,391	19
Emery County	5,137	6,494	26
Castle Dale	541	861	59
Emery	216	219	1
Huntington	857	1,303	52
Orangeville	511	655	28
Ferron	663	756	14
Other and Unincorporated	2,349	2,700	39

Source: Wistisen, 1978.

Income and Employment

Carbon and Emery county employment has traditionally been in agriculture and mining. Recent employment growth, however, has been in energy development, especially in the mining, construction, trade, and transportation sectors. Earnings have increased from $45.6 million in 1970 to $104.3 million in 1975. This was an average growth rate of 18 percent per year for the area.

Total personal income in the Carbon/Emery area increased from $58.8 million to $128.4 million between 1970 and 1975--an average growth rate of 16 percent per year.

The highest monthly wages in Carbon and Emery counties are in mining, construction, and transportation.

Cost of Living

Prices of food, clothing, automobiles, and particularly specialty items may be higher than corresponding prices along the Wasatch Front. It is doubtful, however,that these price differentials would be very great for any significant period of time.

Public Utilities

Water

Domestic water within the Price River area is supplied by a combination of municipal and private water company systems. With the exception of Price City, most of these systems are approaching their practical capacity. A treatment plant and pipeline has been constructed by the Price River Water Improvement District to provide additional supplies for new development.

Individual central water supply systems have been constructed by each of the larger incorporated communities in Emery County. In addition, one extensive rural system has been developed which provides service to Cleveland and Elmo towns and to the unincorporated areas of northern Castle Valley. All of the present systems are at or near their capacity. Table 2-12 shows adequacy of existing and planned domestic water supply systems. Most water-short communities, acting through the Castle Valley Special Service District, are in the process of upgrading their systems to accomodate additional connections. These improvements include construction of additional supply capability, additional storage capacity, and acquisition of additional water rights where required.

Sewer

The Price River Water Improvement District system provides centralized sewage collection and treatment service to the the three municipalities (Helper, Price, and Wellington) within the Price River Valley and to most of the urbanized unincorporated portions of the valley. Collection and treatment facilities outside the valley are maintained by each community.

Centralized collection facilities are provided by six of Emery County's eight incorporated municipalities. Only four of the six maintain treatment systems. Other communities and unincorporated areas use individual disposal systems.

Programs, aided by the Castle Valley Special Service District, are underway which would develop or enlarge the Castle Dale/Orangeville, Ferron, and

TABLE 2-12

Existing Domestic Water Facilities in the Price River and Castle Valley Area

Jurisdiction	Capacity of Existing and Proposed Facilities (In Number of Connections)[a] Water Rights	Supply Capability	Storage Capacity	Numbers of Present Connections	Current Excess (+) or Shortage (-)
Castle Valley					
Huntington	705	1,163[b]	1,250	670	+35
Castle Dale	550	900	950	525	+25
Orangeville	278	200[c]	625	300	-100
Ferron	684	550	625	610	-60
Emery	200	108	100	150	-50
North Emery (with Cleveland and Elmo)	560	270	450	620	-350
Clawson	37	18	0	40	-40
Price River Valley[d]	[e]	6,037	14,950	5,580	+457

Source: Wistisen, 1978.

[a] Based on State Health Department criteria as follows:

Water rights	292,000 gals/connection/year
Supply capability	1,600 gals/connection/day
Storage capacity	800 gals/conection.

[b] Treatment plant under development. Present spring supply limited to 351 connections.

[c] Planned enlargement of treatment plant will increase supply to 890 connections.

[d] Include Price City, Helper City, Wellington, and the Price River Water Improvement District as well as several private systems.

[e] Actual water rights are subject to several variables and are not readily quantifiable.

Cleveland/Elmo systems to a level to accomodate anticipated growth. Table 2-13 contains a summary of sewage facilities.

Education

Student enrollments in Carbon and Emery Counties are now reaching maximum capacity in some schools and immediate building programs will be required to keep pace with present and projected population growth in the area. For example, in the Fall of 1977, the elementary schools in Carbon County were estimated to be near 100 percent of their 2,400 student capacity. Building capacity at the junior and senior high levels was estimated to be 2,200 and was at about 86 percent capacity. In Emery County, elementary schools were at approximately 95 percent of their 1,575 student capacity. There is capacity for growth at the junior and senior high school levels with combined building capacities estimated to be 1,650 students. Student enrollment is currently at 69 percent of capacity.

The Fall of 1977 teacher-student ratio in Carbon County was 1 to 26 and in Emery County it was 1 to 24.

Law Enforcement and Fire Protection

There are approximately 40 law enforcement personnel in Carbon County and about 18 in Emery County. Emery County is having difficulty finding and keeping qualified people because higher paying jobs are available in energy development.

There are jail facilities located in Price, Helper, and in Castle Dale. The Carbon County jail in Price is inadequate for the present population. Based on a national incarceration rate of 60 per 100,000 population, the Emery County jail has the capacity to serve 66,000 people (about 60,000 more than the present population).

All eight municipalities in Emery County are upgrading their fire departments. Due to limited funding, however, the upgrading may not keep pace with projected needs.

Fire protection facilities and equipment in the city of Price are adequate to accommodate present needs and can accommodate additional population growth. Additional facilities and equipment are needed to meet demand in Helper, Wellington, and most other communities in Carbon County.

Medical Care

The Carbon County Hospital, in Price, has a 75-bed capacity, including five beds for psychiatric care. The hospital has an emergency room and intensive care unit.

The Carbon County Hospital presently operates at about 58 percent of capacity. This situation is due, in part, to a physician shortage. Also, many local people choose to travel to Provo (80 miles) or Salt Lake City (120 miles) for medical care.

There is no hospital in Emery County and residents must travel to the Carbon Hospital or outside the immediate two-county area. A medical clinic in Castle Dale, however, has three physicians, one nurse practitioner, and four licensed practical nurses. (The number and type of medical personel change frequently in rural areas.) The clinic offers no inpatient care, but is equipped to provide emergency treatment before patients are transported to a hospital.

TABLE 2-13

Existing Sewage Facilities

Area	Estimated Population	Population Served	Daily Sewage Flow (million gals per day)	Design Capacity (Population)
Price River Valley (Includes Helper Price, and Wellington)	17,000	16,000	1.6	24,000
Huntington	2,500	2,000	0.250	3,700
Orangeville[a]	900	900	0.09	7,000
Castle Dale[a]	1,600	1,600	0.16	
Ferron	1,200	950	0.390	950
Emery	250	250	0.025	1,300

Sources: Southeastern Utah 208 Plan,
Johnson and Tuttle Engineering.

[a] A joint facility is in the final stages of construction.

Ambulances are operated by Emergency Medical Technicians. Mines have their own ambulance service which suppliments the local towns' ambulance service.

In 1976, the Carbon County physician to population ratio was approximately 1 to 1,500; in Emery County, the ratio was about 1 to 2,700.

Psychiatric inpatient services are provided in the Carbon Hospital. In addition, the Four Corners Mental Health Program provides mental health services to the area population. Persons working in mental health have noted a significant increase in need for their services as the population has grown (Wistisen, 1978).

There are nine dentists in Price and an additional two in Helper for the Carbon County population. Emery County has one full-time dentist in Castle Dale and one in Ferron. The 1976 dentist to population ratios are: Carbon County--1 to 1,750; Emery County--1 to 3,200.

Housing

Housing problems were among the first impacts associated with the rapid growth in the Carbon/Emery area. Rapidly increasing demand and a limited housing supply resulted in higher prices for housing, lots, and rentals. These problems are compounded by difficulty of building new single and multi-family housing facilities. Some of the difficulties are time required for subdivisions and zoning approvals; the price and availability of land, materials, and labor; and difficult financing because of skepticism concerning the permanence of the so called "boom."

The cost of new homes increased by at least $10,000 in Price and Castle Dale between 1973 and 1976. When available, two to three bedroom apartments and trailers rent for a minimum of $250 to $300 per month.

The rising costs of housing has led residents to seek less expensive housing such as mobile homes, multi-family dwelling units, lower-cost single family dwellings, and rental units of all types. According to a study by the Southeastern Utah Association of Governments, of the 6,234 housing units in Carbon County in 1976, 78.3 percent were conventional, 15.4 percent were mobile homes, and about 6.2 percent were multi-family units. In Emery County, the respective percentages were 57.3 percent, 41.1 percent, and 1.6 percent of the 2,834 total units (SEUAOG, 1977). The same study also indicates that 36 percent of the conventional housing in Carbon County, and 44 percent in Emery County, are below the acceptable levels.

Most mobile homes are new and therefore are reasonably sound. However, several mobile home parks lack laundry facilities, recreational areas, landscaping, proper electrical grounding, and proper plumbing.

Local Government and Finance

Carbon and Emery counties operate under county commissions. Each town in the area has a mayor-council form of government. All mayors, councilmen, and commissioners serve on a part-time basis.

The Castle Valley Service District includes territory within the seven incorporated municipalities of Castle Valley and both the Huntington and Emery power plant sites.

This special district, was established to provide a legal mechanism for taxing the power plants in order to obtain the additional revenue required by the several municipalities. The additional revenue is used to improve and operate the water, sewer, and transportation facilities required to accomodate population growth resulting from construction and operation of these plants.

Financing of district activities comes from taxes levied against all property and also from water and sewer fees collected from residents.

The area is also part of the Southeastern Utah Association of Governments. This association facilitates cooperative action on issues of common interest or impact to local governmental units in Carbon, Emery, and Grand Counties.

The 1977 county records show that the assessed value of all property in Emery County was $90,862,000. Seventy-five percent of this total is represented by existing power generation facilities. Total assessed value in Carbon County was $55,904,000. The higher level in Emery County can be generally attributed to the two UP&L plants. It should be noted that the State Tax Commission's property reappraisal program was not completed for Carbon County in 1979.

As shown on Table 2-14, most communities within Emery County have significant bonded indebtedness, but those in Carbon County, particularly Price River Valley, are relatively debt free.

Most of the debt for the Emery County area has been incurred in order to improve existing water and sewer facilities to accommodate energy-related population impacts. This has strained local financing capability and is expected to continue to do so as continued demands are made.

Quality of Life

Social Well-Being

The social well-being of residents of the Carbon and Emery County areas have been closely tied to the mining of coal since at least the turn of the Century. Prior to the development of the coal fields in the late 1800's, the two counties were made up largely of small farming communities established by Mormon settlers. The simultaneous development of railroads and coal mines in the 1880's brought about a sharp upswing in population and a two-fold increase in population between 1910 and 1920. As the mines developed, many non-mormon groups moved into the area and settled largely around Price. As a consequence, Emery County towns remained predominately Mormon and the Price area became populated by people of diverse ethnic and religious backgrounds.

Population and employment patterns in both counties have been strongly linked to changes in the coal industry. From the peak population periods around 1920, both counties experienced consistent population declines. An exception was the 1940-1950 period when the coal industry in the area did expand somewhat. Throughout this period, Emery County remained culturally homogeneous with very little religious or ethnic diversity. On the other hand, Carbon County became one of the most religiously and ethnically diverse counties in Utah.

As a consequence of the recent expansion of the coal industry as well as the construction of the Huntington Canyon and the first two units of the Emery power plant, the two county area is again in a rapid growth period. Important changes have occurred in several quality of life indicators during the period of growth. One of the most important indicators are crime rates. In 1974, the Emery County Sheriff's office handled 900 cases. By 1977 this had risen to 2,885 cases. During this same period, the population had increased by about 32 percent from 6,200 to over 8,000. Thus, crime tripled while the population only increased by one-third. The rate of increase was lower in Carbon County. The County Sheriff's office reported about a 20 percent increase in major crimes between 1975 and 1977. A larger increase occurred in "victimless crimes" such as traffic, public intoxication, and drunk driving.

TABLE 2-14

Bonded Indebtedness of Major Units of General Local Government in Carbon and Emery Counties

Area[a]	Amount of Outstanding Bonds (principal)	Total Repayment Cost (principal plus interest)
Emery County	$ 90,000	$ 102,000
Huntington	1,220,000	2,562,000
Castle Dale	N/A	252,385
Orangeville	100,000	111,325
Ferron	405,000	589,360
Emery	192,000	425,680
Castle Valley Special Service District	5,000,000	b
Carbon County		
Price River Water Improvement Dist.	$4,900,000	b

Source: Despain and Despain Consulting Planners, 1978.

[a] Municipalities not listed have no known bonded debts.

[b] Repayment costs were not available.

State of Utah reports show a 40 percent increase in felonies (such as robbery, rape, murder, and burglary over $250.00) in State District 7 between 1975 and 1976. (District 7 includes Carbon and Emery counties along with San Juan and Grand Counties.) This increase is not solely a function of population growth because the felony rate per 1,000 population increased 34.9 percent between 1975 and 1976.

According to the Emery County Sheriff's office, approximately 80 percent of the crimes reported involve burglary, theft, and vandalism. However, major increases have also been noted in bar fights, family beatings, and in alcohol and drug-related offenses. Similar reports were given by Carbon County law enforcement personnel.

Data compiled from the Juvenile Court for the State of Utah indicate that juvenile crime trends in Carbon and Emery Counties differ from overall crime trends. The number of juvenile referrals has increased slightly between 1971 and 1976, but the increase has not been as rapid as increases in population. According to statistics, juvenile criminal offenses are occurring less frequently, on a per capita basis, while overall crime rates are increasing significantly. Truancy and other problems in schools have increased, however. The Emery County School Superintendent reported that children are continually transferring between schools. Average daily attendance figures have dropped slightly from between 95 and 96 percent to between 92 and 93 percent.

The 4-Corners Area Comprehensive Mental Health Center reports that their caseload has increased from 723 in 1973 to 1,150 in 1977. The Comprehensive Mental Health Center operates 5 psychiatric inpatient beds at the Carbon Hospital. In addition, two therapists are now working full-time in Emery County. A half-time alcohol and drug abuse counselor, associated with the area Mental Health Center, is also available in Emery County. A new mental health clinic is needed in Carbon County.

The area's mental health counselors have observed the major caseload increase in the areas of depression, marital and family problems, and attempted suicide. Counselors report that they see more newcomers, employed on energy-related construction jobs or in the mines, than long-time area residents. Many problems are related to job situation, lack of recreational and social opportunities, and lack of integration into the local community and culture.

Alcohol and drug abuse have also increased faster than population increases. The absentee rate at some area mines is reported to be as high as 28 percent. It is estimated that as much as 75 percent of these absences are related to the use of alcohol. If the figures are accurate, problems with alcohol affects the employment and productivity of about 1,500 of the area's 7,200 miners. Some of the mines are planning special projects for counseling to deal with alcohol-related problems. The 4-Corners Area Comprehensive Mental Health Center in Price recently hired a full-time substance abuse counselor.

Satisfaction With the Local Community

A general survey of residents of Carbon and Emery counties was conducted to determine attitudes of local residents toward their communities, toward energy development, and toward related issues (Albrecht, 1975). Over 50 percent of those surveyed said they were "very much satisfied" with their community. An additional 40 percent indicated they were "pretty much satisfied."

Because many important changes have occurred in the study area since 1975, as a result of expanded coal mining and the construction of large power plants, a "key informant" study was undertaken in 1977 (Albrecht, 1977).

Among those interviewed were school superinendents, extension agents, hospital administrators, mayors, county commissioners, sheriffs, the Four Corners Mental health director, and other community leaders. A random general attitudinal survey was also completed one year later (Albrecht, 1978).

Interviews with the key informants generally supported impressions obtained from the random survey. Most respondents expressed satisfaction with their communities. When asked, however, if most people in the area felt that they were a part of their community, one-half responded negatively. The consensus seemed to be that new residents and non-Mormons were not being accepted by longer-term residents. The key informents said an important factor to many people was that more local young people could be employed locally instead of having to seek employment outside the area. (Presently, 66 percent of the Huntington power plant work force are local people and 61 percent of the work force for Unit 1 are local people. Neary all the coal miners for the plants, 81 percent, are local people.)

The 1978 community data still showed a general satisfaction with the area. In this study, respondents were asked to rate their community on a ten-point scale; a score of ten representing the best possible community and a score of one representing the worst possible community. Over 70 percent of the respondents rated their communities seven or higher. Only 2 percent gave a rating of three or lower. The 1978 respondents tended to express optimism about changes in the area; 48 percent said their communities were becoming better. Data from the 1978 survey indicates that local residents favor growth in the economy and size of the local population. Two-thirds of the respondents indicates that the effect of newcomers has been positive for the area. Less than one-quarter felt the effect had been negative.

In response to a question concerning whether there was a problem between long-time residents and newcomers, almost one-third of the 1978 respondents (31 percent) felt that there was no problem at all. Forty percent felt that there was a minor problem, though nothing serious, 26 percent felt that there was a moderate problem, and 3 percent were of the opinion that conflict was serious. These results indicate that some adjustment problems are occuring in the area as experienced in other boom growth areas in the West.

Public Attitudes

In the 1975 survey, the characteristic most liked by Carbon and Emery County residents was the smallness of their communities. Many people said that advantages of their communities were: the rural character; easy access to outdoor recreational opportunities such as fishing and hunting; access to the outdoors; the opportunity to develop close personal ties with neighbors; and that it was a good place to raise a family.

Fewer items were listed as drawbacks to life in Carbon and Emery Counties. Two themes were common in the responses. Respondents were concerned with the absence of shopping facilities and variety, and they were very concerned about availability and quality of local medical services. These two concerns were followed by dissatisfaction with other public services such as sewer, water, and garbage collection.

Key informants tended to stress the following as primary disadvantages of living in the Carbon-Emery County area: lack of organized recreation programs, shortage of water, difficulty in finding adequate (and affordable) housing, lack of facilities and services such as shopping and medical care, isolation from larger communities, and an influx of undesirable types of people.

Traffic

Road deterioration, caused by heavy loads, is increasing accident potential. Increased traffic, especially large trucks, also leads to high traffic hazard.

Coal and other material falling from uncovered trucks are safety hazards in the Carbon-Emery area. While the major hazard is vehicle damage, potential exists for personal injury and loss of life.

Noise levels of diesel trucks traveling at 55 mph vary from 55 to 85 decibels at a distance of 50 feet from the road.

Plant Construction Hazards

Normal hazard to health and safety now exists at construction sites and in industrial operations.

PROBABLE FUTURE ENVIRONMENT OF PROJECT AREA WITHOUT THE PROPOSAL

The following sections briefly describe the area's projected future environment, over the next 35 years, without implementation of the proposal. An analysis of this subject is found in the statement: Development of Coal Resource in Central Utah available from the U.S. Geological Survey.

Projected Levels of Employment, Population, and Community Service

Due to energy related industrial expansion, the Carbon-Emery County area is currently undergoing rapid growth. It is estimated that, without the proposal, employment will increase from 11,361 in 1976 to 22,320 by 1987, (1,610 less than with the proposal). Population will increase from 26,700 people in 1976 to 48,140 by 1987 (about 3,640 less than that with the proposal) (Wistisen, 1978).

As a result of rapid growth, community services will be stressed.

Projected Land Uses

Ownership

Since much undeveloped private land is available for expansion, the land ownership pattern should remain essentially unchanged in the Carbon-Emery area.

Livestock Grazing

Grazing practices in the Carbon-Emery area are generally regulated by federal programs on lands administered by the BLM and USFS. It is not anticipated that there will be any major changes in these programs.

Special Designation Areas

The wilderness inventory process within the influence zone will be completed. Roadless inventory units determined not to possess wilderness character will be eliminated from further wilderness review and will no longer be subject to interim management protection. Units determined to have wilderness character will be identified as Wilderness Study Area (WSA). Any identified

WSA would be subjected to additional review and would be recommended to the President of the United States as suitable or non-suitable for wilderness designation by October, 1991. It is possible that areas within the influence zone could be designated as wilderness by Congress.

Primitive areas, natural areas, and wild and scenic rivers could also be designated within the influence zone.

Mineral Activities

Coal production will continue to increase by virtue of current, firm, out-of-state commercial demands and markets. Land use changes for coal production will affect only a few acres.

Agriculture

Small farm acreages will continue to be cultivated. Overall agricultural acreage may decline, however, due to conflicting uses and demands for irrigation water.

Urban

Industry and community development is estimated to require an additional 1,500 acres in Carbon County and 500 acres in Emery County by 1980.

Transportation

Transportation facilities in the area will continue to improve, but additional acreage requirements will be minimal. Existing roads will be upgraded and improved.

Projected Social Factors

The influence of the original Mormon culture will probably continue to diminish with the influx of new people. It is also likely that some individuals in the present population will be attracted to new cultural values. Past experience shows that some local residents may leave their traditional employment in agriculture in order to work in the growing, more lucrative, energy industry. Urbanization will continue and the quality that made the area attractive to local residents will probably continue to change. Life styles will most likely become more impersonal.

Projected Vegetation and Wildlife Resources

Increased coal development and attendant population increases will likely reduce quality and quantity of the vegetative and wildlife resources in the future.

Current trends in urban expansion will likely cause a large area of open land to be converted to housing, streets, and related development. The natural productive level of vegetation will be lost to livestock and wildlife use. Increased populations will create greater demands for recreational activities such as hunting, fishing, hiking, sightseeing, and off-road vehicle use. Increased activity will probably lead to a greater game animal harvest and to wildlife losses through harassment. There is an upward trend in illegal activity related to wildlife. Citations issued in the Carbon-Emery area have increased 197 percent between 1972 (137 citations) and 1977 (407 citations). Approximately 70 percent of the violations committed involved death of wildlife (UDWR, 1978).

CHAPTER 3

ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

CHAPTER 3
THE ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

INTRODUCTION

This chapter summarizes the environmental impacts that would be expected from construction and operation of the proposed Units 3 and 4.

The significance of an impact depends upon its influence on the human environment, human activities, and human values. The analysis of each impact is traced from the proposed action to man and his environment. To accomplish this, each impact was followed from one environmental component to another. For example, the section on vegetation analyzes the proposal's direct impacts upon vegetation. The section on wildlife analyzes how removal of vegetation would impact wildlife. The recreation portion of the land use section then analyzes how the impact to wildlife would affect recreation.

An impact is discussed if it: 1) is considered controversial, 2) it is of high public interest or concern, 3) it substantially affects the human environment, or 4) if the subject of the impact is protected by law. When it is necessary to clarify the discussion of an impact, its magnitude, incidence, and duration are indicated. If an impact has national, regional, or local importance, this is also indicated. Discussions are in terms of the broad regional setting and specific proposal locations.

Since construction of Emery's first two units is underway, all impacts from that project are considered as part of the existing environment. Should the current proposal be implemented, the construction related impacts, which are now occuring, would continue for about 5 additional years. The Environmental Statement: Development of Coal Resources in Central Utah will analyze the cumulative effects of energy development in the Carbon/Emery County area, including the operation of four units at the Emery power plant.

CLIMATE

In the past few years, the effect of power plant plumes on climate has been investigated in more depth. Technical reports (Parungo, et al., 1978a; Parungo, et al., 1978b; and Pueschel, et al., 1978) on the subject of localized climatological effects of power plants plumes tend to support the theories that fly ash released from a coal-fired power plant can act to form condensation nuclei and ice nuclei in clouds. At present more data is being gathered which must be evaluated before determining the degree to which climate is influenced by power plant plumes.

AIR QUALITY

Standards

National Ambient Air Quality Standards (NAAQS), also adopted by the State of Utah, and the Prevention of Significant Deterioration (PSD) increments and ceilings are shown on Table 3-1. Emission rates for Units 3 and 4 and applicable New Source Performance Standards (NSPS) are shown on Table 3-2. Calculated ground level concentrations and standards for NAAQS are shown on Table 3-3.

The proposed additional units lie within an area classified as Class II. Table 3-4 shows a comparison of the calculated maximum concentrations that would result from Units 3 and 4 and the PSD standards for Class II areas. No PSD standards would be violated as a result of the proposal.

TABLE 3-1

National Ambient Air Quality Standards
and Prevention of Significant Deterioration Increments

Standards	Sulfur Dioxide Annual[a]	 24-Hour[b]	 3-hour[b]	Particulate[c] Annual[a,c]	 24-hour[b]	Nitrogen Dioxide Annual[a]
National and State Ambient Air Quality Standards						
Primary (μg/m^3)[d]	80	365	--	75	260	100
Secondary (μg/m^3)	--	--	1,300	60	150	100
Utah (μg/m^3)	80	365	1,300			
Prevention of Significant Deterioration Increments						
Class I (μg/m^3)	2	5	25	5	10	--
Class II (μg/m^3)	20	91	512	19	37	--
Class III (μg/m^3)	40	182	700	37	75	--

[a] Annual arithmetic mean.

[b] Not to be exceeded more than once per year.

[c] Annual geometric mean.

[d] Micrograms per cubic meter.

TABLE 3-2

Predicted Emissions and Applicable New Source Performance Standards

Emission	Tons Per Day Applicable Standard and Allowable Emission Rate		Emission Rates Units 3 and 4
Sulfur Dioxide	EPA Utah	120 120	12.5
Nitrogen Oxides	EPA	70	70.0
Particulate	EPA	10	4.6

Source: H. E. Cramer Co., 1978a

TABLE 3-3

Comparison of Maximum Calculated Ground Level Concentrations and NAAQS

	$\mu g/m^3$				
Emission	Background[a]	Incremental Increase	Total Concentration	Most Restrictive National Ambient Air Quality Standard	Percent of Standard
Sulfur Dioxide					
Annual	3.5	1.7	5.2	80	7
24-hour	26.0	12	38.0	365	10
3-hour	104.0	54	158.0	1,300	12
Nitrogen Dioxide					
Annual	12.8	12.8	25.6	100	26
Particulates					
Annual	0.7	0.7	1.4	60	2
24-hour	4.8	4.4	9.2	150	6

Source: H. E. Cramer Co., 1978a.

[a] Assumes Units 1 and 2 are included in background. Units 1 and 2 are assumed to have 99.5 percent control of particulates and 80 percent control of SO_2.

TABLE 3-4

Calculated Maximum Concentrations and Standards for the PSD in Class II Areas

	μg/m^3		
Emission	PSD Class II Increments	Maximum Incremental Concentrations	Percent of Standards
Sulfur Dioxide			
Annual	20	1.7	9
24-hour	91	12	13
3-hour	512	54	11
Particulate			
Annual	19	0.7	4
24-hour	37	4.4	12

Source: H. E. Cramer Co.,1978a.

Modeled maximum concentrations and PSD standards for Class I areas (National Parks) are shown on Table 3-5. Modeled maximum concentrations and PSD standards in BLM areas of special interest are shown on Table 3-6.

Sulfur Dioxide

Calculated emission rates for SO_2 would be below the applicable national and state emission standards shown on Table 3-2. The 3-hour, 24-hour, and annual ground level concentrations of SO_2, as shown on Table 3-3, would be below the applicable NAAQS (defined as adequate and necessary for the protection of the human health and welfare). Consequently, adverse impacts to health and welfare (including vegetation, soils, and animals) would not be expected. Although standards would be met, the amount of SO_2 in the atmosphere would be increased during the life of the project.

Population increases, as a result of the proposal, are projected to stabilize at about 3,640. The resulting increase of SO_2 in the atmosphere (generated by vehicle emissions, solid waste disposal, residential and commercial fuel consumption, and other miscellaneous sources) has been estimated using the Environmental Protection Agency (EPA) approximation (EPA, 1974). The increase in SO_2 produced from these sources could amount to approximately 176 tons per year (equal to about 6 percent of the SO_2 emitted from the plant).

Nitrogen Oxides

Estimated annual ground level concentrations of NO_2 would be below the limitations of the NAAQS (Table 3-3). The predicted annual concentrations would be 13 percent of the NAAQS (Cramer and Bowers, 1978). No adverse impacts to health would be expected.

Although emissions of NO_2 would not exceed standards, the amount of NO_2 in the atmosphere would be increased for the life of the project.

Particulates

Calculated ground level concentrations of particulates from the proposed units would be well within limitations of the NAAQS (Table 3-3).

An estimated population increase of 3,640 could add about 230 tons of particulates per year to the atmosphere (generated by vehicles, solid waste disposal, residential and commercial fuel consumption, and miscellaneous sources). This is about 21 percent of the plant's estimated particulate emissions. Coal haul trucks and coal storage piles could also provide an additional source of particulates.

Trace Elements

The coal used at the generating complex would contain small amounts of trace elements which would be released into the atmosphere during plant operation. Trace element deposition has been difficult to assess. Pathways by which trace elements are distributed through the environment are complex and poorly defined. The long-term accumulation of trace elements from power plants is not well known.

A comprehensive trace element study was completed by the Atomic Energy Commission (AEC) with the support of the National Science Foundation around the coal fired Allen steam plant (870 MW) in Memphis, Tennessee. The study concluded that the Allen Plant emissions, after over 14 years of operation,

TABLE 3-5

Modeled Maximum Concentrations and Standards for the PSD in Existing Class I Areas[a]

	μg/m³			
	Capitol Reef	Canyonlands	Arches	Class I Standard
Sulfur Dioxide				
Annual	0.026	0.012	0.011	2
24 Hour	1.3	0.5	0.2	5
3 Hour	5	4	1	25
Particulate				
Annual	0.01	0.005	0.004	5
24 Hour	0.5	0.1	<0.1	10

Source: H. E. Cramer Co., 1978a.

[a] See Figure 2-2 for locations.

TABLE 3-6

Modeled Maximum Concentrations and Standards for the PSD in BLM Areas of Special Interest[a]

Emission and Location	μg/m³ Maximum Incremented Concentration	μg/m³ Class I Limitation	Percent of Limitation
3-Hour (SO_2)			
Sids Mountain	33	25	132
Mexican Mountain	5	25	20
San Rafael Reef	10	25	40
Desolation Canyon	4	25	16
Lower Green River	1	25	4
24-Hour (SO_2)			
Sids Mountain	4.2	5	84
Mexican Mountain	1.1	5	22
San Rafael Reef	1.2	5	24
Desolation Canyon	0.5	5	10
Lower Green River	0.4	5	8
Annual (SO_2)			
Sids Mountain	0.13	2	7
Mexican Mountain	0.04	2	2
San Rafael Reef	0.03	2	2
Desolation Canyon	0.02	2	1
Lower Green River	0.01	2	1
24-Hour Particulates			
Sids Mountain	1.5	10	15
Mexican Mountain	0.4	10	4
San Rafael Reef	0.5	10	5
Desolation Canyon	0.1	10	1
Lower Green River	0.1	10	1
Annual Particulate			
Sids Mountain	0.5	5	1
Mexican Mountain	0.02	5	<1
San Rafael Reef	0.01	5	<1
Desolation Canyon	0.01	5	<1
Lower Green River	0.01	5	<1

Source: H. E. Cramer Co., 1978a.

[a] The BLM areas of special interest are being considered by BLM for possible recommendation to the State of Utah for Class I redesignation or for management for visibility protection. These areas are presently designated Class II. See Figure 2-2 for locations.

had no major impact on trace element concentrations in the environment (AEC, 1973). Similar impacts are expected at the site.

Visibility

The 1977 Clean Air Act Amendments do not provide any guidance on how to assess visibility impacts. Rather, they direct EPA to recommend, by August 1979, methods for quantifying and modeling visibility impacts. Because this environmental statement is scheduled to be completed prior to August 1979, consideration of visibility impacts were performed without benefit of specific guidance. The study of visibility impacts resulting from Units 3 and 4 may not meet the visibility impact assessment requirements needed to meet visibility standards to be proposed by EPA. Nevertheless, a visibility study was conducted by H. E. Cramer Company for the eight areas of special interest including Capitol Reef, Canyonlands, and Arches National Parks (mandatory Class I areas with visibility identified as an important value); Sids Mountain; Mexican Mountain; San Rafael Reef; Desolation Canyon; and the Lower Green River. These areas are shown on Figure 2-2. (A more complete discussion of this study is found in Appendix III-1.)

Table 3-7 shows that visual range would not be reduced, at seven of the areas of special interest during daylight hours, by more than 5 percent of the baseline meteorological range. There could be 11 daylight hours per year, at Capitol Reef National Park, during which reductions in the baseline meteorological ranges would be greater than 5 percent, but less than 10 percent. The 11 daylight hours per year corresponds to an annual occurrence frequency of approximately 0.3 percent of the daylight hours. Canyonlands and Arches National Parks also showed reductions of 1 to 2 percent for 2 to 28 hours per year and reductions of 2 to 5 percent for up to 7 hours per year. The calculated reductions for all areas occurred most frequently during the winter and spring and least frequently during the summer.

The determination of the significance of the impacts to visibility in Class I areas would depend upon the regulations that are to be promulgated by EPA sometime after August 7, 1979. It would also depend upon the federal land manager charged with direct responsibility for management of the affected Class I area in regard to the impact on air quality related values (including visibility). It is the present policy of the National Park Service to protect the scenic values of their Class I areas from any visual impairment at human levels of perception, which is adverse (see Letter No. 2, Chapter 9).

A yellow atmospheric discoloration has often been observed in the Page, Arizona area resulting from emissions from the two 750 MW units of the Navajo Power Plant. The discoloration usually occurs under stable conditions when the plume remains intact. Yellow atmospheric discoloration has been observed from the operation of Emery Unit 1. With additional units, this discoloration could be expected to increase in intensity, spatial extent, and frequency assuming a proportional increase in NOx emissions. The yellow discoloration would be an aesthetic intrusion of varying degree depending upon its intensity and extent.

The atmospheric discoloration modeling study (Cramer, 1978) shows no cases of discoloration, at any Class I or areas of special interest, using the special case of emissions from the Emery power plant observed crosswind of the plume. The case studied did not include other possible conditions when the plume would be contained in an elevated inversion or when the observer might be looking at an angle to the plume, or for a line of sight directed downwind along the plume axis. It was recognized that calculated visibility impacts

TABLE 3-7

Calculated Reduction in Visual Range in Class I Air Quality Areas and Areas of Special Concern

	Percent Reduction[a] and Hours of Daylight Per Year[b]				
Area	0 or Greater	1 or Greater	2 or Greater	5 or Greater	10 or Greater
Capitol Reef National Park	103	45-48	16-28	0-11	0-0
Canyonlands National Park	184	12-28	1-7	0-0	0-0
Arches National Park	92	2-11	0-1	0-0	0-0
Sids Mountain	394	9-17	1-1	0-0	0-0
Mexican Mountain	228	6-9	0-0	0-0	0-0
San Rafael Reef	251	17-20	2-2	0-0	0-0
Desolation Canyon	332	32-32	5-7	0-0	0-0
Lower Green River	132	10-15	0-1	0-0	0-0

Source: H. E. Cramer Co., 1978b.

Note: Areas such as Sids Mountain and Mexican Mountain were calculated to have less reduction in visual range than some more distant areas such as Capitol Reef National Park and Canyonlands National Park. This is due to local meteorological conditions such as wind mixing, dilution, chemical transformation, and air travel time.

[a] Reduction attributable to Units 3 and 4 from existing baseline visual range (including Units 1 and 2).

[b] The hours shown are based upon the number of daylight hours during which the power plant plume would be transported over the area of special interest.

[c] Total daylight hours when visibility reduction potential exists (when effluent from the plant is in the mixing layer of air over the area), based on 1975 meteorological conditions.

are maximized for the along wind view and further that most of the cases of atmospheric discoloration reported from coal-fired power plants appear to have been associated with plumes continued in an elevated inversion layer above the top of the surface mixing layer (Latimer, et al.). The Cramer Company stated that the uncertainties involved with these conditions were too great for reliable visibility impact calculations to be made. Therefore, evidence is not conclusive as to whether Units 3 and 4 would or would not affect visibility in Class I areas (Capitol Reef, Canyonlands, etc.).

GEOLOGY AND TOPOGRAPHY

Subsidence would be expected to occur on the lease area (see Figure 1-9). The exact magnitude cannot be determined, but as much as 10 feet of sinking might occur (Brauner, 1973). (See Appendix II-1 for examples of subsidence effects.) Subsidence could occur shortly after mining a portion of the mine or may not occur until many years after abandonment (NAS, 1975).

VEGETATION

Most construction for Units 3 and 4 would be in areas already disturbed for Units 1 and 2 and little additional vegetation would be lost.

Within the 1,100 acres of proposed transmission line right-of-way, up to 135 acres of vegetation would be removed for tower pads. One species of possibly endangered plant, Townsendia aprica, could be reduced in numbers, or some of its essential habitat could be destroyed by construction of the transmission line.

An Endangered Plant, Phacelia argillacea, could be inadvertenly destroyed by construction of the proposed transmission line where the route crosses the Green River Shale Formation. Implementation of this proposal would not jeopardize the continued existence of nor threaten critical habitat of this plant (see Letter No. 1, Chapter 9).

Essential habitat for possibly threatened and endangered flora within the influence zone could be damaged by increased recreational use (e.g., ORV). Some plants could be destroyed and some species (such as cactus) might be taken by collectors. It is not expected that any species would become extinct, but some species could be destroyed locally.

About 2/3 acre of riparian vegetation would be lost along 1,400 feet of Cottonwood Creek where a culvert is proposed near the Cottonwood Portal.

WATER RESOURCES

Every 4.1 acre-feet of water diverted annually for Units 3 and 4 would retire 1 acre of irrigated farmland. Changing 14,000 acre-feet per year from agricultural use to industrial use could remove a maximum of 3,415 of farmland acres from production during the project's life. Annual irrigation return flows into the San Rafael River drainage could be reduced by approximately 10 percent (7,700 acre-feet) (Hansen, 1978). Flow in the Colorado River, measured at Lee's Ferry, could be reduced by about 3,850 acre-feet--a decrease of .03 percent. (Approximately one-half of the total (3,850 acre-feet) would be lost upstream through evapotranspiration [Iorns, 1965]).

Subsidence following mining operations could intercept ground water aquifers above the mined area. Springs and other surface waters could be affected.

ANIMAL LIFE

Aquatic

Increased fishing pressure could reduce game fish numbers in all major reservoirs, but probably would most adversely affect the smaller lakes, reservoirs, and streams stocked with rainbow trout catchables.

Terrestrial Wildlife

Increases in human population would contribute to the increased loss and harassment of wildlife throughout the influence zone (UDWR, 1978). Losses would result from inadvertant and intentional kills of game species as well as from harassment during critical wintering and reproductive periods. Although there are insufficient data to quantify killing and harassment losses, current data indicate that as the human population in Carbon and Emery Counties increases, violations of game laws also increase. Most violations result in reductions in wildlife population and are related to game species. These losses would occur throughout the life of the project.

The increased human population could result in additional illegal kills of moose and could destroy the herd. To date, illegal kills have limited the herd's growth.

If the maximum 3,415 acres of agricultural land were retired, pheasant habitat in Emery County would be decreased by 7.4 percent. This reduction in habitat could reduce the population by approximately 400 males, 479 females, and the annual production of 1,970 young during the life of the project (UDWR, 1978).

The coal conveyor, load out facility, and mining facilities would occupy approximately 52 acres of deer winter range in Cottonwood Canyon. This represents winter habitat for about seven deer. Additional impacts could occur as deer movements are disrupted by the coal conveyor. Although some elevated sections of the conveyor may allow deer to pass under the structure, the extent to which deer use such crossings is unknown. Insufficient data are available to determine numbers of deer that would be displaced due to mining development in Cottonwood Canyon.

Coal transport and mine traffic on Utah Highway 29 would traverse critical deer winter range for approximately 6 miles. An average of one deer per year has been reported killed by vehicles along this section of highway. Traffic would increase by nearly 400 percent and deer kills could increase to at least four per year during the life of the project (UDWR, 1978). A much higher figure might be expected, since traffic would be greatly increased during late winter and early spring when deer are concentrated near the highway. Other factors expected to increase road-kills are that traffic speeds would increase due to improved road conditions and traffic would increase during critical early morning and late evening hours when deer are most active.

If springs in the lease area above Cottonwood Portal were to dry up as a result of subsidence, all wildlife using them as a water source would be affected. Animals forced elsewhere to obtain water would enter already occupied habitats and population reduction would result. Numbers of wildlife lost and the effect on populations on East Mountain cannot be accurately predicted (USDI, 1977).

Disturbance of essential winter range along 48 miles of the transmission line by construction, between November 1 and May 30, could drive deer and elk from the area. Displaced animals would be lost because other wintering areas are at carrying capacity and could not support additional animals (UDWR, 1978). Winter weakened deer and elk would be subject to stress; losses would occur.

The transmission line would also pass through deer-fawning and elk-calving areas between the north fork of Gordon Creek and Soldier Creek (between mileposts 37 and 57, shown on Appendix II-2). Disturbance by construction in the areas during fawning and calving periods (May 15 to July 15) could result in the loss of deer fawns and elk calves (UDWR, 1978).

Moose wintering and calving could be adversely affected through harassment and disturbance if transmission line construction proceeded between November 1 and July 15. As this herd is small and struggling for survival, any loss would be important (UDWR, 1978).

Transmisson line construction across the sage grouse strutting ground ground near Scofield Reservoir, between March 15 and May 30, could result in a loss of sage grouse production. Grouse could be driven from strutting grounds and nesting areas. Displaced birds would not breed and their production would be lost for that year (UDWR, 1978).

Stringing the proposed transmission line near Provo Bay and Powell Slough would cause a disturbance of a few days to waterfowl and other marshland birds. Construction during the nesting period (March 15 to July 31) would cause an undetermined loss of production. Losses would be local in nature and would not have a long-term effect on population levels.

Sightings of bighorn sheep and river otter are too infrequent to form a basis to determine impacts.

Wild Horses and Burros

Increased recreation on the San Rafael Swell and adjacent areas could increase harassment of wild horses and wild burros. Chasing of horses and burros by off-road vehicle (ORV) users during the foaling season could result in the loss of an undetermined number of animals.

Threatened and Endangered Species

The increase in human activity could contribute to additional shooting and harassment of bald eagles and peregine falcons within the influence zone. Any loss would be important as these animals are uncommon.

The proposed transmission line would pass through bald eagle wintering areas from Huntington to Gordon Creek and in Spanish Fork Canyon. Harassment and disturbance during construction could adversely affect bald eagles. It is not likely that implementation of this proposal would jeopardize the cntinued existence nor critical habitat of the bald eagle (see Letter No. 1, Chapter 9).

The proposed transmission line would increase the flight hazard to peregrine falcons hunting near Provo Bay and Powell Slough. The extent of loss would be small, but because few peregrine falcons remain, any loss would be significant.

Sightings of the black-footed ferret are too infrequent (and unconfirmed) to form a basis for determining impacts.

Although fishing pressure may increase within the Green River in the influence zone, the increase is not expected to result in a change in status for the endangered and proposed threatened and endangered fish in the Green River.

Formal consultation with the United States Fish and Wildlife Service, as required by the Endangered Species Act of 1973, was initiated by memorandum dated August 18, 1978. A copy of the biological opinion is attached as Letter No. 1 in Chapter 9.

CULTURAL AND PALEONTOLOGICAL RESOURCES

On-Site Damage

Cultural resources within the sampled areas which would be disturbed do not meet National Register eligibility criteria. A "Memorandum of Understanding" between the Bureau of Land Management and the State of Utah guarantees compliance with the "procedures for the protection of historic and cultural properties" (36 CFR 800). This memorandum is found in Chapter Nine.

Highly important paleontological remains of scientific value, in the Green River and North Horn Formations, could be encountered during construction of the transmission line (Miller, 1978b). With standard requirements as described in Chapter 1, no significant loss of scientific values is expected.

Illegal Collecting and Vandalism

Many archaeological sites are known to exist in the influence zone. Increased vandalism to both cultural and paleontological values would result from the increased population and new access brought about by the proposal.

Illegal collecting of artifacts would mean a loss in the scientific understanding of ancient cultural activities in the area. Loss of materials could occur to sites listed on the National Register of Historic Places and the Utah State Register of Historic Sites. Similar impacts would occur to paleontological resources.

SCENIC RESOURCES

The addition of two units would not add appreciatively to the present man-made contrast at the plant site. It would, however, be more obvious to travelers on U-10, and to viewers from areas of Class A scenery (see Appendix II-6 for definition) on the Wasatch Plateau, the San Rafael Swell, and from a rest area on I-70 on the San Rafael Swell. The additional units would be considered a landmark of interest to some and an additional intrusion to others.

The coal conveyor and truck loading site in Cottonwood Canyon would establish high man-made contrast in an area of presently low contrast. Aesthetics of the area would be degraded for recreationists using Cottonwood Canyon or U-29 for access to the Joes Valley area.

The proposed transmission line would parallel an existing line and would generally create a low to medium increase in man-made contrast. The transmission lines would be more obvious to travelers. Any additional clearing of vegetation would result in a medium increase in contrast.

Table 3-8 shows the expected increase in man-made contrast at highway crossings.

TABLE 3-8

Increase in Man-Made Contrast at Highway Crossings

Highway	Transmission Line Milepost	Additional Increment of Contrast
U-10	8	Low
U-31	16	Low
U-122	26	Low
U-50	28	Low
U-96	50	Medium
US 50-6	58	Medium

The addition of power lines at the mouth of Spanish Fork Canyon would somewhat degrade the visual resource, but would not add appreciatively to the present man-made contrast.

Any atmospheric discoloration or reduction in visual range would degrade scenic quality in areas of special interest. Predicted reductions in visual range at these areas would be less than the 10 to 20 percent variations that presently occur and may not be noticeable (Cramer, 1978). Calculations showed there would be no cases of discoloration at any area of special interest.

MINERALS

Seventy million tons of coal would be mined for Units 3 and 4. About 50 million tons would come from the Wilberg and Deseret-Beehive Mines and 20 million tons from the open market. Estimated coal remaining in the mines, lost to recovery, would be 47 million tons--a total loss of 117 million tons of nonrenewable coal reserves. The amount represents about 15 percent of the total known coal reserves in the East Mountain area and less than 2 percent of the known coal reserves in the Wasatch Plateau coal field.

Improved access as a result of paving the road in Cottonwood Canyon, as proposed, would enhance coal development.

LAND USE

Agriculture and Livestock Grazing

An annual maximum of 14,000 acre-feet of irrigation water would be acquired from local farmers to supply the needs of the generating complex. Water would be transferred from agricultural use to industrial use and could result in retirement of up to 3,415 acres of agricultural land in the Ferron-Castle Dale-Huntington area. The retirement of 3,415 acres could result in a total estimated loss annually of 10,245 tons of alfalfa hay, or 184,410 bushels of barley or oats, or 500,000 pounds of beef (about 750 steers). Loss of this production would likely continue beyond the lifetime of the project. Change in land use as a result of diverting water from agricultural to industrial use could impair the ability of ranch property to support livestock while they are not on federal land. Thus, grazing on BLM and USFS administered lands could be reduced because the livestock owners might not be able to meet permit requirements. The exact location and magnitude of impact is unknown.

Prime farmlands and farmlands of state-wide importance could have power transmission structures placed on them. However, the area that would be removed from production would be small. The magnitude of the impact to prime farmlands by conversion of water from irrigation to industrial use cannot be determined because the exact farmlands which would be retired have not yet been identified. It is possible, but not probable, that all 3,415 acres of farmland retired could be classified as prime.

Recreation

The influx of people into the area would affect urban and non-urban recreational sites. Overcrowding of recreational facilities could cause deterioration of physical improvements and environments (vegetation, soils, water quality) and change the quality of recreational experiences. Existing recreational facilities operated by federal, state, and local governmental agencies would be most affected. Officials from federal, state, and local agencies indicate that existing budgets are inadequate to provide for construction and maintenance of new recreational facilities.

Additional pressure at developed facilities would cause greater deterioration of those sites presently being over used (used at greater than 40 percent of capacity) and some site degradation to other facilities (see Table 2-6). This overcrowded condition would cause additional pressure on dispersed recreation areas. The result would be sanitary and garbage problems.

Recreational facilities in towns and cities in the influence zone would become overcrowded. Additional municipal facilities (e.g., parks, swimming pools, tennis courts, and golf courses) would be needed to meet minimum standards recommended by the Heritage Conservation and Recreation Service, formerly the Bureau of Outdoor Recreation (BOR, 1977).

The increase in permanent population would mean an additional 14,321 visitor days (4 hours of use per day) annually spent fishing for the life of the project. This would result in an increased demand of 35,500 fish annually by 1987. This could require increased trout stocking to maintain present fisherman success. An estimated additional 700 hunters would be afield annually in pursuit of big game and an additional 300 hunters in pursuit of upland game, an increase of 7 percent. The additional competition for available fish and game would most likely lead to less hunter and fisherman success and result in dissatisfaction with the recreation experience.

ORV use by people associated with the proposed project would increase creating additional pressure on suitable lands.

Special Designation Areas

Within the influence zone, areas with potential for special designation (wilderness, primitive, natural, wild and scenic river) may receive additional ORV and other visitor use, resulting in degradation of values for which they are being protected and studied.

Transportation Systems

Trailing cattle along U-29 and the Cottonwood Creek road (USFS Road 50040) would be hindered.

From U-29 to the Cottonwood portal, paving of about 2.9 miles of road would improve access and eliminate safety hazards in the lower portions of Cottonwood Canyon. However, the design at the portal would limit right-of-way width to about 32 feet, thus constraining future upgrading of the road and future development and use of the canyon.

Increased traffic on the highway system (U-29) would accelerate road damage and increase road maintenance costs.

HUMAN RESOURCES

Population

The population resulting from the proposal is expected to peak in 1985 with 3,840 persons entering the area. The long-term direct and indirect population resulting from the project would stabilize in 1987 at 3,640. It is estimated that 71 percent of the 3,640 persons would settle in existing communities in Castle Valley and about 29 percent would live in the Price, Helper, Wellington area. Table 3-9 shows total projected direct and indirect population. Table 3-10 shows direct and indirect population by county and community. Appendix III-2 summarizes the methodology used in projecting population increases.

Employment

Table 3-11 shows the projected direct and indirect employment, for Carbon and Emery counties, which would result from construction and operation of Units 3 and 4. The greatest impact would occur in 1984 when employment would increase by 9.4 percent over the employment level without the project. The increase would occur 1 year before the actual peak employment attributable to the project. In 1987, direct and indirect employment due to Units 3 and 4 would stabilize at 1,610 jobs--a 7.2 percent increase over the number of jobs without the project. Although this number is expected to remain at 1,610, its relative significance would decrease as other jobs in the area increase. Jobs would be mostly in the mining, construction, utility, and trade sectors.

Income

Table 3-12 contains projections of earnings and personal income for the Carbon-Emery County area for 1980-1987. The additional earnings related to Units 3 and 4 reflect the following average employee earnings per year for each component: construction, $22,000; coal transportation, $18,000; mining, $17,000; plant operation, $15,000, and other indirect, $7,000.

Cost of Living

Major increases in cost of living, due to energy development in the Carbon-Emery area, are most likely to occur in the areas of residential real estate (both housing and land) and public services (water, sewer, police, fire, etc.).

Based upon a study of the market value of housing by the Southeastern Association of Governments, the market value of new homes in Price and Castle Dale, without influence from Units 3 and 4, increased by 33 to 39 percent between 1973 and 1976. During this same period, the market value of old homes increased by 56 percent in Price and by 39 percent in Castle Dale. The national

TABLE 3-9

Direct and Indirect Population: Carbon and Emery Counties, 1980-1987

Year	Total Population (Including Units 3 and 4)	Population Attributable to Units 3 and 4	Percent Increase Due to Units 3 and 4
1980	34,180	370	1.1
1981	35,450	1,080	3.1
1982	39,020	2,900	8.0
1983	40,490	2,630	6.9
1984	43,720	2,690	9.2
1985	46,310	3,840	9.0
1986	48,820	3,590	7.9
1987	51,780	3,640[a]	7.6
1990	57,450	3,640[a]	6.8

Source: Wistisen, 1978

[a] Stable population attributable to Units 3 and 4 from 1987 thru useful life of unit.

TABLE 3-10

Projections of Direct and Indirect Population by Community
1980, 85, and 87

Community	1980			1985 (peak)			1987		
	Total Population Including Units 3&4	Population Due to Units 3&4	% Increase Due to Units 3&4	Total Population Including Units 3&4	Population Due to Units 3&4	% Increase Due to Units 3&4	Total Population Including Units 3&4	Population Due to Units 3&4	% Increase Due to Units 3&4
Carbon County	22,490	140	1	29,560	1,130	4	33,640	1,060	3
Price River Valley	19,430	140	1	26,220	1,130	4.5	30,190	1,060	4
Emery County	11,690	230	2	16,750	2,710	20	18,140	2,580	17
Cleveland/Elmo	890	10	1	1,660	310	23	1,940	360	23
Huntington	2,190	50	2	2,670	410	18	2,740	360	15
Castle Dale	2,320	90	4	3,200	640	25	3,360	530	19
Orangeville	1,320	20	2	2,130	390	22	2,360	380	19
Ferron	1,760	50	3	2,640	490	23	2,870	440	18
Emery	430	0	--	810	160	25	940	180	24
Unincorporated	1,780	10	1	2,490	310	14	2,730	330	14
Castle Valley Total	10,690	230	2	15,600	2,710	21	16,940	2,580	18
Green River	1,000	0	--	1,150	0	--	1,200	0	--

Source: Wistisen, 1978.

TABLE 3-11

Direct and Indirect Employment: Carbon and Emery Counties, 1980-1987

Year	Total Employment (Including Units 3 and 4)	Employment Attributable to Units 3 and 4	Percent Increase Due to Units 3 and 4
1980	14,350	170	1.2
1981	15,050	520	3.6
1982	16,850	1,360	8.8
1983	17,570	1,140	6.9
1984	19,310	1,660	9.4
1985	20,710	1,680	8.8
1986	22,160	1,550	7.5
1987	23,930	1,610[a]	7.2
1990	26,560	1,610[a]	6.5

Source: Wistisen, 1978.

[a] Stable direct and indirect employment attributable to Emery Units 3 and 4 from 1987 through useful life of the units.

TABLE 3-12

Projected Earnings[a] and Personal Income:[b]
Carbon/Emery County Area

Year	Category	Millions of 1975 Dollars: Total Including Units 3 and 4	Millions of 1975 Dollars: Amount Attributable to Units 3 and 4	Percent Increase Due to Units 3 and 4
1980	Earnings	158.3	6.3	4
	Personal Income	190.8	3.8	2
1981	Earnings	172.7	18.7	12
	Personal Income	201.2	11.2	6
1982	Earnings	212.7	46.7	28
	Personal Income	232.6	28.6	14
1983	Earnings	210.2	33.2	19
	Personal Income	238.4	20.4	9
1984	Earnings	237.1	46.1	24
	Personal Income	263.7	28.7	12
1985	Earnings	247.7	39.7	19
	Personal Income	281.5	25.5	10
1986	Earnings	256.3	30.3	13
	Personal Income	298.5	20.5	7
1987	Earnings	277.6	30.6	12
	Personal Income	324.8	20.8	7

[a] Wages and salaries, other labor, plus proprietor's income by place of work.

[b] By place of residence and includes earnings plus residence adjustment, dividends, interest, rent and transfer payments less personal contributions for social insurance.

TABLE 3-13

Domestic Water Supply Systems
(In Connections)

Jurisdiction	Total Needs	Needs Due to Units 3 & 4	Percent Change Due to Units 3 & 4	Excess (+) or Shortage (-) (Based on Present and Planned Systems) Rights	Supply	Storage
1980						
Castle Valley:						
Huntington	725	15	2.1	-20	+438	+525
Castle Dale	715	25	3.6	-165	+185	+235
Orangeville	430	10	2.4	-152	-230	+195
Ferron	705	15	2.2	-21	-155	-80
Emery	165	0	0.0	+35	-57	-65
North Emery[b]	725	5	0.7	-165	-455	-275
Clawson	80	5	6.7	-43	-62	-80
Price River Valley	6,045	45	0.8	[a]	-8	+8,950
1985						
Castle Valley:						
Huntington	880	130	17.3	-175	+283	+370
Castle Dale	1,000	200	25.0	-450	-100	-50
Orangeville	730	170	30.4	-452	-530	-105
Ferron	985	155	18.7	-301	-435	-360
Emery	285	50	21.3	-85	-177	-185
North Emery[b]	1,055	135	14.7	-495	-785	-605
Clawson	170	45	36.0	-133	-152	-170
Price River Valley	8,165	365	5.7	[a]	-2,128	+6,785
1987						
Castle Valley:						
Huntington	900	110	13.9	-195	+283	+350
Castle Dale	1,055	165	18.5	-505	-155	-105
Orangeville	800	165	26.0	-522	-600	-175
Ferron	1,060	140	15.2	-376	-510	-435
Emery	325	55	20.4	-125	-217	-225
North Emery[b]	1,185	155	15.0	-625	-915	-735
Clawson	220	65	41.9	-183	-202	-220
Price River Valley	9,400	340	3.7	[a]	-3,363	+5,550

Source: Wistisen, 1978.

State Health Standards: Water Rights, 292,000 gallons per connections per year; Supply 1,600 gallons per connections, per day; Storage, 800 gallons per connection.

[a] These water rights are subject to several variables and are therefore not readily quantifiable.

[b] North Emery Water Users Association, a private company, serves the towns of Cleveland and Elmo as well as adjacent unincorporated areas.

average price increased by 31 percent during the same period. The cost of shelter, then, in the Carbon-Emery area increased more than the national average. The market value of homes is likely to continue to increase with the energy developments proposed during the 1980-85 period.

Water

Table 3-13 shows the anticipated number of domestic water supply connections which would be needed to service the population increase due to Units 3 and 4.

Additional improvements would be required in the municipal water systems in Castle Valley to accomodate the population growth attributable to Units 3 and 4 as well as population from other sources. It appears, with proper planning and with the financing capacity of the Castle Valley Special Service District, that such facilities could be provided in time to meet the projected demand.

With the completion of the new Price River Water Improvement District treatment plant, the system's supply capability can accomodate the total anticipated growth in the Price River Valley through 1980. The storage capacity can accomodate the total anticipated growth through 1987. Units 3 and 4 would account for no more than 4 percent of the total new connections anticipated during any year between 1976 and 1987 and further upgrading of the system's supply capability would be required even if Units 3 and 4 were not constructed. Most of the domestic water systems in Emery County are approaching or have exceeded their capacity in terms of water rights. Further growth will require the aquisition and conversion of additional agricultural water rights to domestic use regardless of the construction of Units 3 and 4. Competition for these rights is keen and some difficulty may be had in obtaining them. The magnitude of lost crop production resulting from conversion of agricultural use to domestic use is unknown.

If required improvements are not completed in time to meet projected demand, severe water shortages could result.

Sewer

Table 3-14 shows sewage disposal requirements that would be needed through the year 1987. Proposal related population in Carbon-Emery counties would represent an increase over the projected population without the project, but would represent only slightly increased impacts. Those systems requiring new construction or additions would require the improvements even without Units 3 and 4. Individual septic systems would be required for residences in areas not served by sewage disposal systems.

Education

Table 3-15 shows the projected school age population including the increase which would result from Units 3 and 4.

By 1985, 185 more teachers would be required in Carbon and Emery counties to maintain the 1977 student to teacher ratio. The additional teachers would be required by all projected growth and 38 of them (26 percent) would be needed as a result of Units 3 and 4. In 1987, a total of approximately 246 additional teachers would be needed and about 36 of them (17 percent) would be attributable to the proposal.

TABLE 3-14

Sewage Disposal Requirements: Carbon/Emery County Area 1980, 85, and 87

Year	Total Population Served Including Units 3 and 4[a]	Number Served Due to Units 3 and 4[a]	Excess (+) or Shortage (-) of Capacity (Numbers of People)	% Increase Over Population Without Units 3 and 4
1980				
Castle Valley:				
Huntington	2,200	50	+1,500	0.5
Castle Dale/ Orangeville	3,640	110	+3,540	4.0
Ferron	1,760	50	-810	2.9
Emery	430	0	+870	0.0
North Emery	890	10	-890	1.1
Price River Valley	18,200[b]	130[b]	+5,800	0.7
1985				
Castle Valley:				
Huntington	2,670	410	+1,030	18.1
Castle Dale/ Orangeville	5,330	1,030	+1,670	24.0
Ferron	2,640	490	-1,690	22.8
Emery	810	160	+490	24.6
North Emery	1,660	310	-1,660	23.0
Price River Valley	24,900[b]	1,075[b]	-900	4.5
1987				
Castle Valley:				
Huntington	2,740	360	+960	15.1
Castle Dale/ Orangeville	5,720	910	+1,280	18.9
Ferron	2,870	440	-1,920	18.1
Emery	940	180	+360	23.7
North Emery	1,940	360	-1,940	22.8
Price River Valley	28,700[b]	1,000[b]	-4,700	3.6

Source: Wistisen, 1978.

[a] Hydraulic capacity is based on a standard of 100 gallons per day per person. To figure hydraulic capacity in gallons, multiply the population figure by 100.

[b] Assumes that 95 percent of the residents would be connected to the Price District system.

TABLE 3-15

School-Age Population: Carbon/Emery Counties
1980-1987

Year	Age Group	Total School-Age Population Including Units 3 and 4	Number Attributable to Units 3 and 4	Percent Increase Due to Units 3 and 4
1980	5-13	5,600	70	1.3
	14-17	2,350	20	0.1
	Total	7,950	90	1.1
1985	5-13	8,190	640	8.5
	14-17	3,110	280	9.9
	Total	11,300	920	8.9
1987	5-13	9,170	600	7.0
	14-17	3,610	260	7.8
	Total	12,780	860	7.2

Source: Wistisen, 1978.

By 1985, 38 classrooms would be needed as a result of Units 3 and 4. By 1987, classroom needs would be reduced to about 34. This represents about 7 percent more classrooms than the 477 that would be needed in the area without construction of Units 3 and 4.

Law Enforcement and Fire Protection

A major increase in law enforcement personnel in Carbon and Emery counties would be required to meet the demands created by continued population growth resulting from energy development. Demands directly associated with the construction of Units 3 and 4 would be minimal in comparison with requirements without the project. Table 3-16 shows the estimated law enforcement needs in Carbon and Emery counties.

Growth will require additional highway patrolmen, city police, and county sheriffs' deputies. Law inforcement facilities will require expansion or replacement in Carbon County. The new Emery County facility is capable of absorbing substantial population growth.

The anticipated population growth through 1987, with or without Units 3 and 4, could be accomodated in Emery County with additions of minor equipment and personnel if the upgrading of facilities continues as planned (Wistisen, 1978).

As the Helper and Wellington fire departments are upgraded, the anticipated population growth through 1987, with or without Units 3 and 4, could be accomodated with additions of minor equipment and manpower.

Medical Care

Table 3-17 summarizes the needs for additional physicians and dentists in Carbon and Emery Counties as a result of energy development growth. The identified needs assume maintenance of the 1976 ratios of physicians and dentists per population unit.

While significant demands for additional medical personnel will occur during the next several years in the two-county area, these demands will occur largely independently of the proposed Units 3 and 4. Due to difficulties in attracting medical personnel to rural areas, meeting these needs will be difficult.

Much of the additional demand for medical needs can be accomodated by existing facilities. Unless additional medical personnel are attracted to the area, however, large numbers of people may continue to seek medical care outside the area.

Housing

Table 3-18 shows the projected number of households for the Carbon-Emery County area for 1980-1987. It is assumed that each household would demand one housing unit, e.g., single family home, apartment, mobile home, etc.

The peak number of housing units attributable to Units 3 and 4 would be 1,190 in 1985 and the stable 1987 requirement would be 1,130--only 60 fewer units.

The projected 1987 total is about an 81 percent increase in housing units over the 1976 total. The high demand for housing can be expected to sustain high costs and other housing related problems now being experienced in the Carbon-Emery area.

TABLE 3-16

Estimated Law Enforcement Personnel Needs in Carbon and Emery Counties[a]

Year	County	Total Needs Including Units 3 and 4	Additional Needs Due to Units 3 and 4	Percent Increase Due to Units 3 and 4
1980	Carbon	37	0	0.0
	Emery	19	0	0.0
1985	Carbon	49	2	4.1
	Emery	28	5	17.9
1987	Carbon	56	2	3.6
	Emery	31	5	16.1

Source: Albrecht, 1978a.

[a] Based on a ratio of 1/600 in Carbon County and 1/550 in Emery County.

TABLE 3-17

Additional Physicians and Dentists Required to Maintain 1976 Population Ratios[a] 1980-1987

Year			Total Needs Including Units 3 & 4	Needs Due to Units 3 & 4	Percent Increase Due to Units 3 & 4
1980	Carbon:	Physicians	15	0	--
		Dentists	13	0	--
	Emery:	Physicians	4	0	--
		Dentists	4	0	--
1985	Carbon:	Physicians	20	1	5
		Dentists	17	1	6
	Emery:	Physicians	6	1	20
		Dentists	6	1	20
1987	Carbon:	Physicians	23	1	4
		Dentists	20	1	5
	Emery:	Physicians	7	1	17
		Dentists	6	1	20

Source: Wistisen, 1978.

[a] Carbon County: Physicians 1/1500; Dentists 1/1750
Emery County: Physicians 1/2700; Dentists 1/3200.

TABLE 3-18

Households in Carbon/Emery Counties 1980-1987

Year	Total Including Units 3 and 4	Number Attributable to Units 3 and 4	Percent Increase Due to Units 3 and 4
1980	10,850	110	1.0
1985	14,630	1,190	8.9
1987	16,390	1,130	7.4

Source: Wistisen, 1978.

Tax Base

Table 3-19 summarizes the additional local tax revenue which would result from construction and development of Units 3 and 4. The estimates reflect the additional revenue generated by the development of the Carbon/Emery area, but do not reflect the total revenue which would be collected during the period. Not all of the revenue listed would be used exclusively by the counties and municipalities in the impact area. The sales tax on plant construction material may accrue to local governments outside of the impact area and the Federal Mineral Lease Fund revenue is placed in general accounts to be used throughout the state to benefit areas impacted by mineral development. The local tax on retail sales and the property tax revenues would be distributed between Emery and Carbon counties consistent with the distribution of population, housing, industrial, and commercial development. The property tax attributable to the power plants would accrue to Emery County alone ($6,175,000 per year for Units 3 and 4).

The need for increased community services due to Units 3 and 4 could be expected to precede the availability of project related tax revenues. This could continue to cause delay in providing adequate service and fiscal difficulty for local governments. The Castle Valley Special Service District could help to minimize the problems within its boundarys.

Quality of Life

Social Well-Being

This particular proposal would contribute about 9 percent to the area's future economic and population growth. The predicted quality of life and social well-being changes will be influenced more by overall coal development than by the proposed construction and operation Units 3 and 4.

Energy-related population growth in the Carbon and Emery County areas during the past several years has already caused some important quality of life impacts. This has been particularly true in Emery County where small rural communities have experienced as much as 100 percent population increases between 1972 and 1978. New income and employment opportunities have affected the economic well-being of many area residents (for example, median family income in Emery County has more than doubled since 1970) and other quality of life changes have also been experienced.

Long-term residents who value the smallness and isolation of their communitis are likely to be most negatively affected. These same individuals would continue to be most seriously hurt by the higher prices accompanying boom growth in rural areas. Many of these live on fixed incomes and are unable to benefit from the higher wages associated with the energy industry. They must pay the higher prices, however, for the goods and services that they need.

One of the major consequences of rapid growth is greatly increasing pressure on local services and facilities. A lag often exists between the time demands are made for new or expanded services and the time when the tax base expands enough to provide those services. Other problems are being felt in the availability of housing, sewer and water, and medical services for the expanding population.

Since better quality housing has not been available, unattractive trailer court settlements will continue to increase in the smaller communities of Emery and Carbon counties. This type of settlement is often crowded, without

TABLE 3-19

Local Tax Revenue Due to Units 3 and 4
Carbon and Emery Counties

Revenue Source	Thousands of 1975 dollars							
	1980	1981	1982	1983	1984	1985	1986	1987
Local Sales Tax[a]								
Retail	17	50	129	92	129	115	92	94
Plant Const. Materials	52	139	266	165	244	91	--	--
Total	69	189	395	257	373	206	92	94
Property Tax[b]								
Residential	38	126	377	367	661	742	748	756
Other Locally Assessed	20	67	200	195	350	393	396	401
Units 3 and 4	--	--	--	3,088	3,088	6,175	6,175	6,175
Mines	--	--	37	135	171	294	294	294
Total	58	193	614	3,785	4,270	7,604	7,613	7,626
Federal Mineral Lease Fund[c]								
Community Impact Account	--	--	7	27	34	59	59	59
Balance Account	--	--	6	23	29	49	49	49
Total	--	--	13	50	63	108	108	108
Total Local Tax Revenue	127	382	1,022	4,092	4,706	7,918	7,813	7,828

Source: Wistisen, 1978.

[a] Based on 0.75 percent local sales tax.

[b] Based on 20 percent assessed valuation at 81 mills for residential/other and 65 mills for plants and mines.

[c] Fifty percent of the revenue from federal coal leases is returned to the state where the lease is located. Utah distributes 32.5 percent of the state share to the "Community Impact Account" and 27.25 percent to a "Balance Account" which may be appropriated to the Department of Natural Resources or as the legislature may direct. Both accounts are available for local governments but need not necessarily return to the impact area.

lawns, and lacking in other amenities that contribute to a better quality of life. The housing market will be unable to keep up with coal development growth. Many of the incoming workers associated with Units 3 and 4 would be required to live under these less attractive conditions.

Gilmore and Duff (1974), in discussing the experiences of Wyoming communities going through rapid population growth, have noted the following:

> In Sweetwater County, Wyoming, the ratio of population/physicians is 3,300 to 1 (in the State of Colorado, the ratio increased tenfold while the population went from 18,000 to 30,000 in three years. The increase generated a different type of caseload, i.e., much higher incidence of broken home problems, alcoholism, and down-and-outs.

They further state that:

> In Gillette, Wyoming, ... an earlier boom abruptly escalated high school dropout rates, as jobs and wages increased steeply. Massive, unplanned mobile home parks sprung up; sometimes squatter colonies of trailers lacking normal water and sanitation facilities proliferated. The 1973 Housing Inventory. . .indicated 72 percent of the county's nonurban housing stock is mobile homes.

In discussing these and related developments, Gilmore and Duff note that the demand for services increased much more rapidly than has the property tax base.

Satisfaction With Local Community

Varying levels of resident's satisfaction concerns were registered in the community surveys conducted by Albrecht and others in both 1975 and 1978. These concerns indicate possible adverse impacts on the life style of area residents that would result from Units 3 and 4. Persons interviewed in 1978, however, did tend to feel that the problems created by the influx of outsiders have not been as bad as anticipated. Since the more recent study was limited to Carbon County, it did not measure the more visible conflict between newcomers and longtime Emery County residents.

Individuals and families living on fixed incomes would be unable to benefit from the higher wages that are associated with the energy industry. However, they have to pay the higher prices for the goods and services that they need. On the other hand, they could also benefit from new facilities and services. The new facilities and services should also permit newer residents, attracted by the energy industry, to be more satisfied with the area.

Not all area residents exhibit favorable attitudes toward newcomers. Several key informants noted that itinerant construction workers have caused many problems for the area communities, particularly in Emery County.

Crime rates, alcohol and drug abuse problems, mental health caseloads, and family problems have all increased concurrent with recent population growth in the area. The magnitude of these problems will worsen as the population grows as a result of energy development and will be more noticeable in the rural communities of Emery County. The additional population resulting from Units 3 and 4 would contribute to these problems. The contribution would be slight.

Public Attitudes

As reflected in the 1977 interviews with key informants and the 1978 attitudinal survey conducted by Albrecht, England, and Geertsen, a majority of residents of the area feel positive toward the growth that has occurred in the past few years. They continue to support continued moderate population and economic growth in the future. Most respondents, however, objected to "boom" growth. To the extent that Units 3 and 4 would contribute to rapid growth, it may be viewed more negatively.

Local residents feel generally favorable toward newcomers working on energy-related projects. Key informants observed that coal development has brought "new blood" into the area and has provided additional employment.

Major concerns of key informants were that the proposal would: increase crowding; increase competition for water; increase competition for necessary services; result in more crime, delinquency, and personal problems; and increase pollution. These local attitudes and perceptions are based on the experience that the informants have had with growth over the last few years. Many of these impacts will continue independently of the proposed construction of Units 3 and 4.

Traffic

If the project were implemented, actual numbers of highway accidents would increase. An average of 1.87 accidents and 2.96 fatalities per million miles traveled could be expected (Utah DOT, 1978).

Traffic along the coal haul route would increase 300 to 400 percent creating a new potential traffic hazard to private vehicles and, in particular to slow moving recreational and agricultural traffic. Utah State Highway 29 is not designed to carry heavy industrial traffic and the coal haul trucks would increase its average daily traffic (ADT) by 152 percent.

The funneling of traffic from a two-lane paved road, below the Cottonwood portal, to a single-lane dirt road with turn-outs, above the portal, would create a traffic safety hazard. The number of accidents that would occur is not known, but would continue until the road is upgraded beyond this point.

The nearest town to the coal haul road is Orangeville, about 0.5 miles from the route. Residents of Orangeville could expect a noise level of about 60 weighted decibels (dBa) outside their homes, and a 50 dBa level inside a frame house with the windows open. These levels are not hazardous to health, but may be annoying to residents (Utah Department of Transportation, 1976).

CHAPTER 4

MITIGATING MEASURES NOT INCLUDED IN PROPOSED ACTION

CHAPTER 4
MITIGATING MEASURES NOT INCLUDED IN PROPOSED ACTION

INTRODUCTION

Company proposed design features and government agencies' standard requirements are discussed in Chapter 1. Mitigating measures unique to Units 3 and 4 are discussed in this chapter. Measures are included which are feasible, committed, and enforceable by government agencies and are expected to be implemented because of existing laws, court decisions, or agency policy.

MEASURES UNIQUE TO THIS ACTION AND REQUIRED OF THE APPLICANT BY FEDERAL AGENCIES

Authority for requiring the following mitigating actions is granted under the same authority as described in Chapter 1 for mitigating measures.

If the proposed project were approved, the applicant, under federal law, would be required to carry out the following on Bureau of Land Management (BLM), U.S. Forest Service (USFS), and Bureau of Reclamation (USBR) administered lands:

1. Prior to construction activity on the Green River Shale formation, a botanist familiar with the endangered "Scorpionweed" *Phacelia argillacea* would survey the Green River Shale formation where it would be crossed by the proposed transmission line. The survey would be conducted during the plant's growing season (June 1 to October 1 [Welsh, 1978c]) and all individual plants would be protected from disturbance.

   Construction activities on the Green River shale would be limited to the plant's growing season and a botanist familiar with *Phacelia argillacea* would be present during all construction activities on the Green River shale. No construction would be permitted until the botanist determined that no individual plants of these endangered species would be damaged by that construction.

2. During critical periods, cease transmission line construction in essential deer, elk, moose, and waterfowl nesting habitat areas along the transmission line. Table 4-1 lists essential habitat areas and periods of concern.

3. The applicant will prepare photographic simulations of areas in which facilities are proposed within foreground-middleground areas of high scenic value or high sensitivity. Using the simulation as a guide, the applicant will design and locate structures to blend into the existing environment. Affected governmental agencies would evaluate and approve measures before construction is begun.

4. Use helicopters to erect towers and string conductors, in areas designated by the appropriate federal offical, where access across the terrain or management constraints preclude standard construction methods.

5. Replace all water lost above the mine workings, as identified by the hydrologic monitoring program, which is used by livestock or wildlife. The plans and actions related to the replacement of water would be reviewed and approved by the appropriate federal official.

All mitigating measures outlined here could be modified as deemed necessary by the appropriate federal offical in cooperation with responsible state agencies.

TABLE 4-1

Essential Habitats and Periods of Concern

Species	Concern	Periods	Mileposts[a]
Deer	Winter range	Nov. 1 to May 30	18-25, 26-31, 54-56 58-73, 74-79, 80-83
Bald Eagle	Wintering area	Nov. 15 to March 15	15-16, 17-25, 26-31 66-73, 74-79
Elk	Winter range	Nov. 1 to May 30	54-56
Deer	Fawning area	May 15 to July 15	54-56
Elk	Calving area	May 15 to July 15	54-56
Waterfowl	Nesting areas	March 15 to July 31	93-95, 100-102

[a] Locations shown in Appendix II-2.

MEASURES REQUIRED OF THE APPLICANT BY STATE AND LOCAL ENTITIES

The mitigating measures required on federal land could also be required on state and local government lands. Authority is granted to the State of Utah under the Utah Code Annotated (UCA) 1953, 65-2-1.

EFFECTIVENESS OF MITIGATING MEASURES

A survey for the endangered *Phacelia argillacea* during its growing season would enable a botanist to locate individual plants along the transmission line route and to designate areas where construction activity would be prohibited. Some individual plants of *Phacelia argillacea* might begin to grow along the transmission line route between the time of survey and actual construction. A botanist familiar with the species, present during construction, would ensure that no individual plants would be destroyed. Requiring construction between June 1 and October 1 would ensure that the plant would be growing and therefore recognizable. Local rerouting of the transmission line could be required to avoid damaging individual plants of *Phacelia argillacea*.

Deer and elk are sensitive to harassment while bearing young and during the later months of the winter season. During January through April, deer are in a weakened condition and disturbance can cause death. Mitigation would prevent disturbance during this period on federal land along the transmission line corridors. These measures would also eliminate harassment to wintering bald eagles. Sage grouse, if disturbed during the strutting period, would not mate and reproduction would be lost for that year. Disturbance of moose on wintering and calving areas would result in a reduction of moose numbers. Disturbance on private land to sage grouse, moose, elk, and deer cannot be prevented by federal or state officials and impacts would still occur. Proper scheduling of construction activities in the Provo Bay and Powell Slough areas would prevent lost production of waterfowl, shorebirds, or raptors.

Using photographic simulations of transmission line structures would show how structures could be designed and colored to blend with the environment. Structures would be visible and would often dominate the landscape character, in spite of these measures.

CHAPTER 5

ADVERSE IMPACTS WHICH CANNOT BE AVOIDED SHOULD THE PROPOSAL BE IMPLEMENTED

CHAPTER 5
ANY ADVERSE IMPACTS WHICH CANNOT BE AVOIDED SHOULD THE PROPOSAL BE IMPLEMENTED

INTRODUCTION

This chapter summarizes adverse impacts which would affect the human environment and which cannot be avoided should the proposal be implemented. The impacts mitigated in Chapter 4 have been subtracted from the total impacts described in Chapter 3. Remaining adverse impacts are set forth here.

AIR QUALITY

The discharge of pollutants into the atmosphere would be an unavoidable impact.

Sulfur Dioxide

Residual sulfur dioxide (SO_2) emission rates would be approximately 9.5 tons per day using average grade local coal, or 12.5 tons per day using poorest grade local coal with the units operating at 100 percent capacity. Annual emissions of SO_2, using average grade local coal with the units operating at 80 percent capacity would be approximately 2,800 tons. Emission rates and ambient air contrations would be within federal and state air quality standards, but would still cause unavoidable air quality degradation in the area.

Nitrogen Oxide

Emission rates would be about 70 tons per day or approximately 24,080 tons per year. These emission levels would not produce ambient air concentrations of nitrogen oxide (NOx) higher than allowed by the National Ambient Air Quality Standards (NAAQS).

Particulates

Assuming 99.5 percent control, particulates released would amount to 3.7 tons daily using average grade local coal and 4.6 tons per day using poorest grade local coal with the units operating at 100 percent capacity. Approximately 1,100 tons per year would be released using average grade local coal with the units operating at 80 percent capacity. No adverse impact on human health and welfare would be expected from these releases.

Trace Elements

Coal contains small amounts of trace elements which would be released to the atmosphere during plant operation. Trace metals may eventually accumulate in some ecosystems near the plant site, but there are insufficient data to quantify impacts.

Visibility

Based on available data, visibility in Capitol Reef National Park could be reduced up to 10 percent for up to 11 hours per year. Visibility at other Class I areas and BLM areas of special interest would be reduced by no more than 5 percent for short periods (see Table 3-7). It is the present policy of the National Park Service to protect the scenic values of their Class I areas from any adverse visual impairment of human levels of perception (see letter Number 2, Chapter 9).

The atmospheric discoloration observed as a result of NOx emissions from Unit 1 would be expected to increase in intensity, spatial extent, and frequency, assuming a proportional increase of NOx emissions, with the operation of additional units.

GEOLOGY AND TOPOGRAPHY

It is not possible to determine how much of the land to be mined would subside. Depth could be as much as 10 feet (Brauner, 1973). A relatively narrow, peripheral zone around the leased area could subside, but this would be hardly discernible. There are insufficient data to estimate the extent of surface fractures, bulges, or sinkholes (see Appendix II-1).

VEGETATION

A species of possibly endangered plant, Townsendia aprica, could be reduced in numbers or some of its essential habitat could be destroyed by transmission line construction. Essential habitat for possibly threatened and endangered flora within the influence zone could be damaged by increased recreational use (e.g., ORV). Some plants could be destroyed and some species (such as cactus) might be taken by collectors. It is not expected that any species would become extinct.

About 1,400 linear feet (about 2/3 acre) of riparian vegetation would be lost along Cottonwood Creek.

WATER RESOURCES

Change in Use

Use of water at the plant would change the use of 14,000 acre-feet of water per year from agricultural to industrial. The change in use would reduce annual return flows from irrigation into the San Rafael River drainage by approximately 10 percent (7,700 acre-feet annually) (Utah Division of Water Resources, 1976).

Subsidence following mining operations could intercept ground water aquifers above the mined area. Springs and other surface waters could be affected. The magnitude of this impact cannot be determined.

ANIMAL LIFE

Aquatic

As a result of the increased human population, fishing pressure would increase. The increased pressure could reduce game fish numbers in all of the major reservoirs, but would most adversely affect the smaller lakes, reservoirs, and streams stocked with rainbow trout catchables.

Terrestrial Wildlife

Increased human population would add to the pressure being exerted on all wildlife within the influence zone--in terms of individual animal losses, habitat loss, and harassment. The increased human population could result in more illegal killing of moose and other wildlife.

Were springs to dry up as a result of subsidence, all wildlife dependent on these springs would be affected and numbers reduced.

Disturbance of deer and elk winter range on private lands along the transmission line (mileposts 31-41, 46-47, 53-54, 56-58, 73-74, 79-80, 83-84 shown on Appendix II-2) would be expected during the critical period (November 1 to May 30). Construction during this period would result in loss of deer and elk.

Disturbance of deer and elk on private land, mileposts 38-54, 56-58, during construction of the transmission line would be expected during fawning and calving periods (May 15 to July 15). Disturbance could contribute to loss of deer fawns and elk calves.

Transmission line construction on private land (mileposts 50-51) during the sage grouse strutting period (March 15 to May 30) would be expected to cause a decrease in sage grouse reproduction.

Moose wintering and calving in willow riparian areas along the transmission line (milepost 41-43, 46-47, 57-58) would be adversely affected if construction proceeded on private lands between November 1 and July 15. Total effects on wintering moose cannot be predicted.

Removal of small grain and alfalfa crops, from a maximum of 3,415 acres of farmland, would reduce cover and food for ring-necked pheasants. Pheasant habitat in Emery County would be decreased by as much as 7.4 percent resulting in a loss of as high as 900 breeding pheasants and their annual production of approximately 2,000 young.

Construction of the coal conveyor and mining facilities would occupy and disturb deer winter range in Cottonwood Canyon. Deer would be forced into other areas resulting in reduced numbers. The coal conveyor would present a physical barrier to deer disrupting their migrations. Habitats presently occupied could be lost and deer numbers reduced.

Coal transport and other mining traffic on Utah Highway 29 would cross essential deer winter range for approximately 6 miles. Road kills on U-29 would be expected to increase as a result of increased traffic.

Threatened or Endangered Species

Human population increase could contribute to increased illegal shooting and harassment of bald eagles and peregrine falcons in the influence zone. Though the magnitude of loss is unknown, any loss would be important.

The proposed transmission line would pass through bald eagle wintering areas between Huntington and Gordon Creek and in Spanish Fork Canyon. Harassment and disturbance during construction on private lands (mileposts 16-17, 32-38, 73-74, and 79-80) could have an adverse effect on bald eagles.

CULTURAL AND PALEONTOLOGICAL RESOURCES

Impacts from additional people in the influence zone would result in partial destruction or total loss of scientific information. This information has value for recreational and interpretative purposes. The amount of loss and significance cannot be accurately predicted. Damage could occur through ground disturbance during construction, to subsurface values not initially discovered through field inventories. Even if salvage is performed, an unknown amount of scientific evidence would be lost due to limited techniques.

SCENIC RESOURCES

The plant would be more obvious to travelers on Highway U-10 and to viewers from areas of Class A scenery on the San Rafael Swell and the Wasatch Plateau and a rest area on I-70. The coal conveyor and loading site would degrade aesthetics of Cottonwood Canyon and Highway U-29.

An additional transmission line at highway crossings would be more obvious to travelers. The power line would degrade the quality of the scenery at the mouth of Spanish Fork Canyon.

Any reduction in visual range would degrade the scenic quality at areas of special interest. Predicted visual range reductions in these areas would be less than the 10 to 20 percent variability that presently occurs, and might not be noticeable (Cramer, 1978). Calculations show there would be no cases of atmospheric discoloration at any area of special interest (Cramer, 1978).

MINERALS

A maximum of 70,000,000 tons of coal would be removed, leaving behind an estimated unrecoverable 47,000,000 tons of coal. The total loss (117,000,000 tons) of nonrenewable coal reserve would be unavoidable. The loss would represent about 15 percent of the known coal reserve in the East Mountain area, but less than 2 percent of the known coal reserves in the Wasatch Plateau coal field (Doelling, 1975).

LAND USE

Agriculture

A maximum of 3,415 acres of agricultural land in the Ferron-Castle Dale-Huntington area could be retired from agricultural production as a result of change in water use from agricultural to industrial. Though the exact acreages of prime farmlands that could be retired is unknown, it is likely that part of the 3,415 acres would be of this type of land.

Change in land use as a result of diverting water from agricultural to industrial use may impair the ability of ranch property to support livestock while they are not on federal land. Grazing on BLM and USFS administered lands may be reduced as the livestock owners could be unable to meet permit requirements.

Recreation

Additional pressure would cause greater deterioration of those sites presently being over used (greater than 40 percent use) and some site degradation to the others (see Table 2-6). This pressure would cause additional use of dispersed areas. Sanitary and garbage problems are expected.

Additional competition for available fish and game would lead to reduced hunter and fisherman success and could result in some dissatisfaction with the recreation experience.

Special Designation Areas

Areas with potential for special designation (wilderness, primitive, natural, wild and scenic river) in the influence zone may receive additional ORV and other visitor use, resulting in degradation of values for which they are being protected and studied.

Transportation Systems

Increased traffic would result in local highway congestion, accelerated road damage, and impairment to local livestock trailing.

HUMAN RESOURCES

Population

Total population associated with the proposal would peak at 3,840 in 1985 and would stablize at approximately 3,640 in 1987.

Income and Employment

Annual income in Carbon and Emery counties by 1987 would increase by about $20.8 million to a total of $324.8 million as a result of the proposal. This income would benefit the work force, but persons with fixed incomes in Carbon and Emery counties would have reduced buying power.

Total employment due to Units 3 and 4 is expected to stabilize at 1,610 jobs in 1987, down from a peak of 1,680 in 1985.

Water Supplies and Sewage Disposal Systems

Water systems are unable to satisfy existing demand and this problem would continue if the project were approved. Additional water and sewer systems would be required to meet needs.

Education

By 1985, proposal related school-age population would be about 920. By 1987, this number would probably drop to around 860.

In order to maintain the Fall, 1977 teacher to student ratio, 34 additional classrooms and 36 new teachers would be needed to accommodate anticipated project related students in 1987.

Law Enforcement and Fire Protection

A major expansion in law enforcement manpower would be required, but would be mainly attributable to continued population growth not directly associated with construction of Units 3 and 4. Expansion or replacement of existing facilities in Carbon County would be needed.

It is anticipated that law enforcement problems would be similar to those that have occurred in recent years--increases in family-related problems, alcohol and drug offenses, vandalism, and thefts. Again only a relatively small portion of these expected increases would be attributable to the proposal.

Fire protection facilities in Carbon and Emery counties would require only minor equipment and manpower increases to accomodate the anticipated population growth, with only a minor portion of the needed increase attributable to the project.

Medical Care

To maintain the 1976 level of medical care, two additional physician and two additional dentists would be required by 1987 to serve the population increase attributable to Units 3 and 4. It is not certain that medical personnel would come to the area. If they do not, medical care would be less available than at the present time.

Housing

Approximately 1,130 housing units would be needed for project related population in 1987. About 29 percent of the employees would live in Price River Valley and about 71 percent would live in the Castle Valley area.

Quality of Life

Housing demands will become more of a problem; local crime rate will continue to increase; and demands will be created for additional health and educational facilities and personnel as a result of coal development in Carbon and Emery counties. Units 3 and 4, because they would account for 9 percent of this increased population, would add an increment of stress.

Conflict between long-time residents and newcomers has already occurred to some extent in the two-county area and is likely to become more serious as coal development continues.

Community satisfaction would change and long-time residents would see their communities grow and become subject to the same problems and less personal way of life found in larger towns and cities. Families living on fixed incomes would have to pay more for goods and services.

The people would continue to feel positively toward the growth and continue to support moderate population and economic growth. However, boom growth conditions would be viewed negatively.

Traffic

If the project were implemented, actual numbers of accidents would increase. Increased industrial traffic on coal haul roads would create a new potential traffic hazard to other vehicles and in particular to slow moving agricultural and recreational vehicles.

The nearest town to the coal haul road is Orangeville, about 0.5 miles from the route. Residents of Orangeville could expect a noise level of about 60 weighted decibels (dBa) outside their homes, and a 50 dBa level inside a typical frame house with the windows open. These levels are not hazardous to health, but may be annoying (Utah Department of Transportation, 1976).

CHAPTER 6

THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

CHAPTER 6

THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN's ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The large scale increase in human activity involved with the proposal would derive short term values from the environment which would affect its long term productivity. For Units 3 and 4, the short term is the project's predicted life--35 years. Long-term is the period beyond the project's predicted life.

Cumulative effects of coal development in the Carbon-Emery area, as well as cumulative effects on air quality, are discussed in the Draft of the Environmental Statement: Development of Coal Resources in Central Utah. That statement projects the mining of a total of 383,000,000 tons of coal, leaving another 383,000,000 tons of unrecoverable coal in the mines, and disturbance of up to 2,400 acres of land for mining and associated activities. Coal and energy development is not expected to cause air pollution which would exceed allowable standards. Other cumulative impacts identified (but not quantified) are subsidence and subsequent changes in water flows; increased landslides, rockslides, rockfalls; scars left after reclamation of mining areas; loss of wildlife and wildlife habitat; damage to archaeological and paleontological values; and the effects of more people moving to areas near the mines. It is estimated that Units 3 and 4 would be responsible for about 9 percent of the cummulative impacts brought about by the increased human population resulting from continuing coal development in Carbon and Emery counties.

Units 3 and 4 would use water, coal, air, space, and community services. They would add about 9 percent to the rapid growth now underway in the Carbon-Emery County area. These people and their families would build homes, attend school, shop, and recreate within the area.

The presence of Units 3 and 4 would still be felt even after they were shut down. Any land removed from cultivation would probably remain uncultivated after plant shutdown. This would result in long-term losses of agricultural and wildlife production.

The 70,000,000 tons of burned coal would be gone forever, as would any fossil record contained in that coal. The coal would have been mined by methods which leave about 40 percent of the coal in the mine. Unless unforeseen techniques in coal mining were developed, the remaining coal would never be recovered. More efficient mining techniques could be used if they were developed while the mines were still operational.

Subsidence could occur following coal mining and could disrupt surface and subsurface water flows. Even though the Surface Mining Control and Reclamation Act requires that land use long-term productivity must be the same after mining as it was prior to development, it appears unlikely that all waters would ever be replaced for use by wildlife. The extent of these impacts cannot be accurately predicted, but they would be of long-term duration.

Burning coal to run the units would release pollutants into the atmosphere, but emissions would cease when plant operations ceased. During the predicted 35 years of operation, other air-polluting projects may be limited in the Emery-Carbon county area. Any reduction in visual range or clarity within areas of special interest would cease when plant operations stop.

Scars caused by disturbance of soils and vegetation for transmission line construction, would gradually heal, but could still be apparent in some areas after the project's life. It is possible, but not probable, that some possibly threatened plant species would be impacted enough to warrant being reclassified to endangered. Extinction of any endangered animal or possibly endangered plant species is not probable. However, it is possible that some plant species could be destroyed locally.

Illegal removal or destruction of archaeological and paleontological remains would result in a loss of some scientific understanding. Present archaeological salvage techniques do not insure total information recovery.

With wet cooling towers now being installed at the Emery site for Units 1 and 2, along with Units 3 and 4, as high as 6,386 acres of agricultural land could be retired in Emery County due to water use at the Emery (Hunter) power plant site.

The transmission line might serve another power source and would probably remain beyond the project's life. When the units now being proposed have become obsolete, the generating complex could be kept in reserve for peak electrical loads or could be redesigned or rebuilt to house up-to-date generating facilities.

CHAPTER 7

ANY IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE INVOLVED IN THE PROPOSED ACTION SHOULD IT BE IMPLEMENTED

CHAPTER 7

ANY IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE INVOLVED IN THE PROPOSED ACTION SHOULD IT BE IMPLEMENTED

Many natural, human, man-made, and monetary resources would be irreversibly or irretrievably committed if Units 3 and 4 were built.

Irreversible commitment is defined as incapable of being reversed; once initiated, action would continue. Actions committing future generations to continue a similar course may be considered irreversible. Irretrievable is defined as irrecoverable; not retrievable; once used, not replaceable.

Some resources, such as air quality and water, would be irretrievably affected during plant operation. Others, such as coal, would be consumptively used and could never be replaced. Some theoretically reversible commitments would, in practice, be irreversible; the commitment of land occupied by the physical plant would be such a commitment.

Table 7-1 is a list of irreversible and irretrievable commitments for Units 3 and 4.

TABLE 7-1

Irreversible and Irretrievable Commitments for Units 3 and 4

Resource	Reason for Commitment	Commitment Irreversible	Irretrievable
Air Quality	Degradation caused by emissions from generating station and work force.	no	project life
Geology and Topography	Subsidence following coal mining.	yes	yes
Vegetation	Clearing for construction.	no	until revegetated
	Loss of possibly threatened or endangered plants.[a]	yes	yes
Water Resources	Change from irrigation to industrial use.	no	project life
	Flow changes in springs and seeps caused by subsidence.	yes	yes
Animal Life	Loss of wildlife and their reproductive potential through increased habitat loss, inadvertant kills, hunting, and harassment.	no	yes
	Loss of threatened or endangered animals.[a]	yes	yes
Cultural Resources	Disturbance of sites by construction or vandalism.	yes	yes
Paleontological Resources	Disturbance and loss of fossils by construction, vandalism, or use of coal.	yes	yes
Scenic Resources	Contrast of conveyor in recreation access areas, and contrast of all structures.	no	Life of facilities and structures
	Contrast from clearing of vegetation for transmission line construction.	no	until revegetated

Continued

TABLE 7-1 (concluded)

Resource	Reason for Commitment	Commitment Irreversible	 Irretrievable
	Possible air quality degradation of the five areas of special interest.	no	project life
Minerals	Mined and unrecoverable coal: 117,000,000 tons.	yes	yes
	Mined and consumptive use of 35,450 tons of limestone.	yes	yes
	Diesel fuel for coal transport: 8,500,000 gallons.	yes	yes
	Fuel oil (#2 diesel) for generator startup: 44,000,000 gallons.	yes	yes
Land Use	Loss of up to 3,415 acres of irrigated land.	no	yes
	Increased use of recreational sites.	no	yes
Human Resources	Change in lifestyle.	yes	yes
	21,400 work-years labor for construction and operation of units and mines.	no	yes
	$700,400,000 for capital costs.	no	yes
Public Safety	More accidents from increased traffic	no	yes
Building materials	Consumptive use of: 122,000 cubic yards concrete 112,000 cubic yards sand, gravel, and fill 43,300 linear feet of plastic pipe 2,789 tons conductor 270 tons shield wire.	yes	yes

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[a] No extinction of any species is expected.

CHAPTER 8

ALTERNATIVES TO THE PROPOSED ACTION

CHAPTER 8
ALTERNATIVES TO THE PROPOSED ACTION

INTRODUCTION

This chapter presents alternatives to the proposal. Five alternative sites are described and potential impacts are compared with those resulting from the proposed action. Operation of a power plant at the alternative sites (Nephi or Delta, Utah) would be dependent on water from the Bonneville Unit of the Central Utah Project (CUP). The impacts from diversion of CUP water will be analyzed in an environmental statement for the Bonneville Unit and therefore will not be discussed in this statement.

Facility and operational aternatives discussed, for Units 3 and 4, are plant design and operating methods; water sources; mining techniques; water, coal, and electrical transport systems; delay; no action; and other sources of energy.

All company proposed design features and government agencies standard requirements described in Chapter 1 apply to all parts of this section. Chapter 4 mitigation also pertains to the Green River and Wellington alternatives. Only additional mitigating measures unique to a specific alternative are given in detail.

ALTERNATIVE SITES FOR COAL-FIRED, STEAM-ELECTRIC GENERATING PLANTS

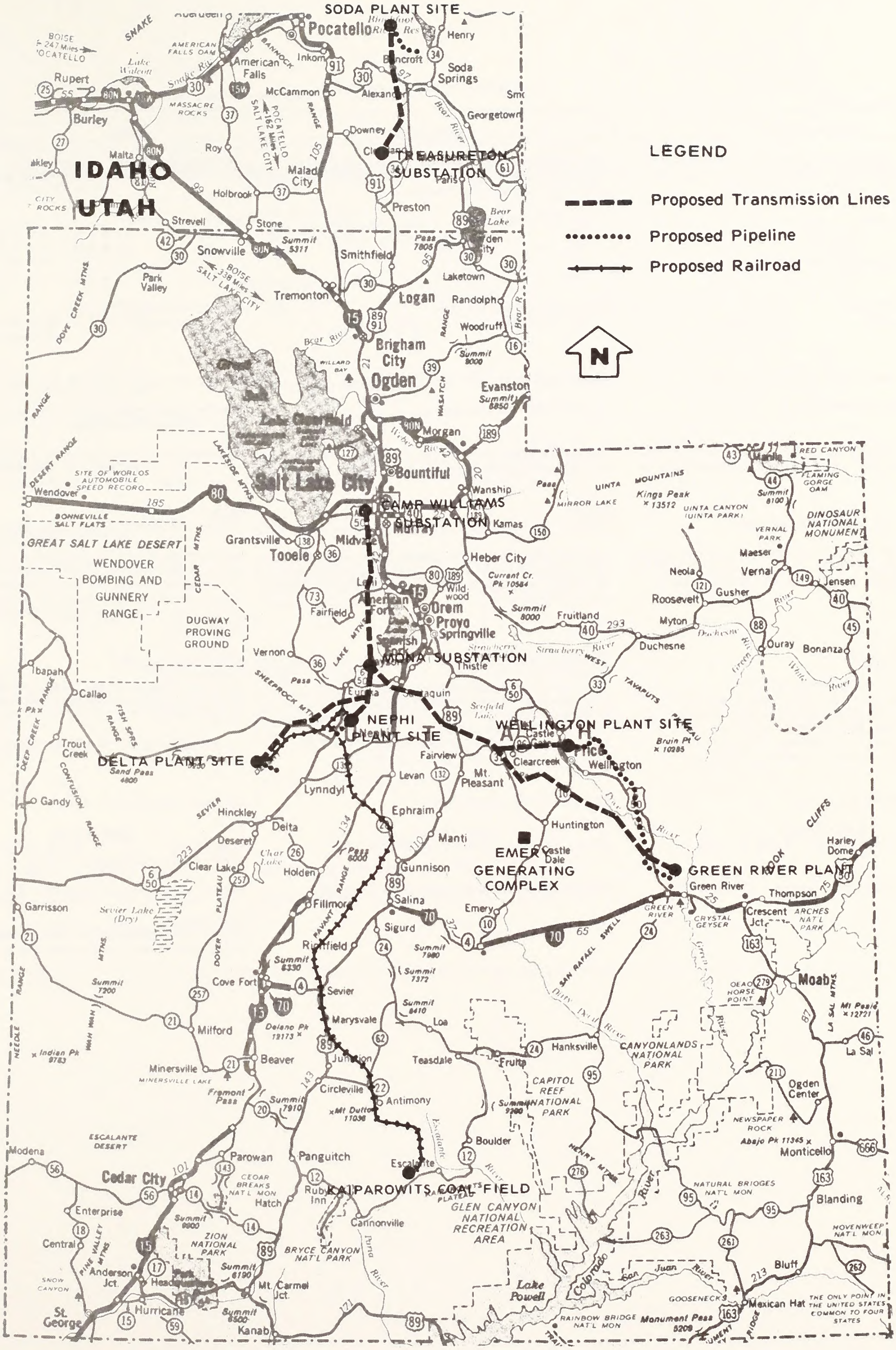
General

The applicant and BLM examined five alternatives to the Emery site. The five, shown on Figure 8-1, are the Green River, Wellington, Nephi, Delta sites in Utah, and the Soda Spring Site in southern Idaho.

Each alternative plant site would consist of two 500-MW units and ancillary facilities. The units would be 500-MW as a result of long-term planning analysis performed by UP&L. Each would require a somewhat different arrangement of facilities to conform to terrain features although the basic plan, as shown in Figure 1-5, would be similar. Because of the larger units and different coal quality, more coal and water per year would be required than under the proposed Units 3 and 4. The market area would be the same as for the proposal.

Table 8-1 compares alternative site descriptions and Table 8-2 compares environments within primary (areas of actual disturbance by project components) and secondary influence areas (areas affected by the population--about 2-hours driving distance from the nearest large population center or 60 miles radius from the site). Table 8-3 compares impacts and Table 8-4 summarizes unavoidable adverse impacts among the alternatives and the proposal.

Items are listed opposite to each other for comparative analysis.



ALTERNATE POWER GENERATING SITES AND FACILITIES FOR EMERY UNITS 3 AND 4

FIGURE 8-1

TABLE 8-1

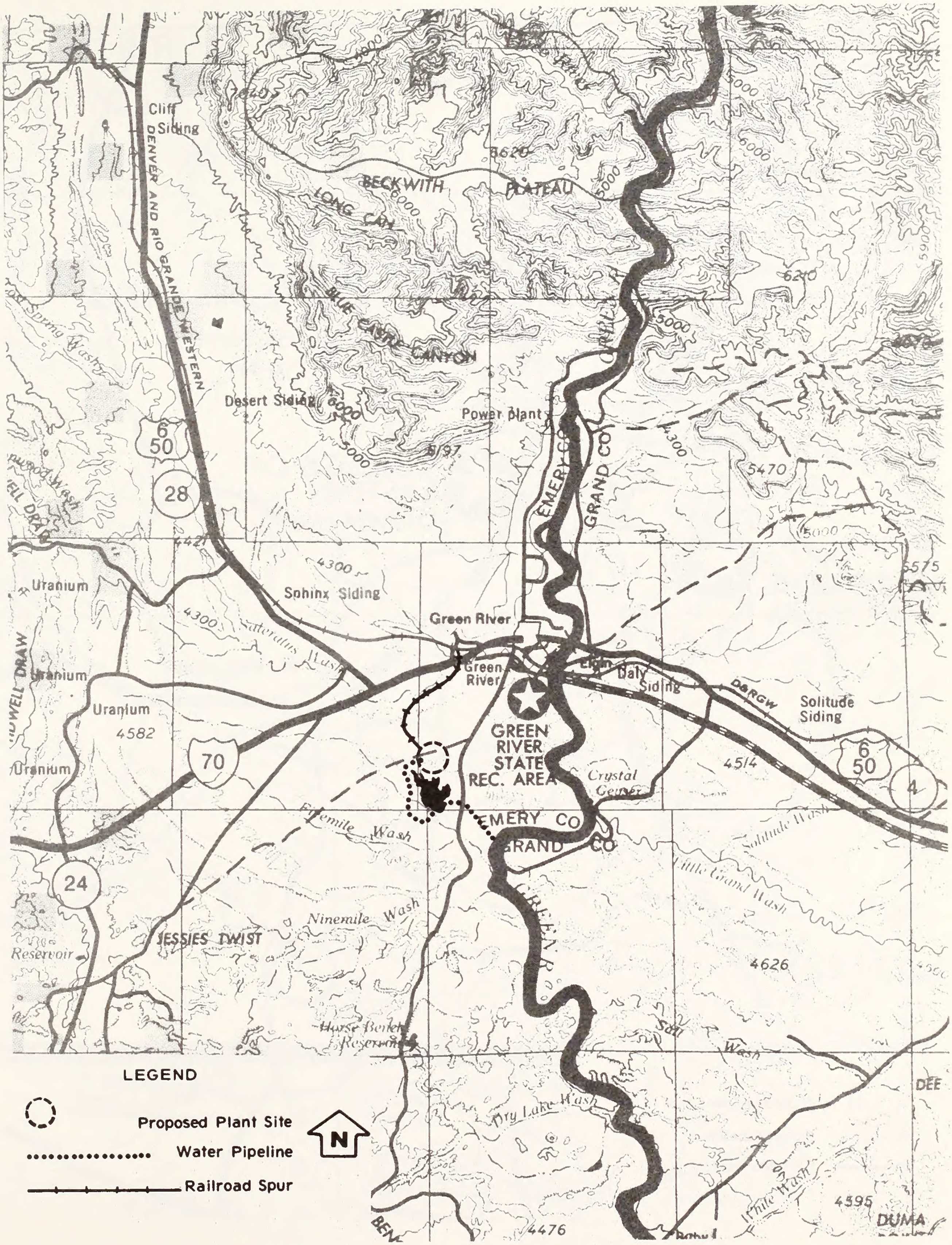
Alternative Sites Description

Green River	Wellington	Nephi
Generating Complex (Figure 8-2) Land Status--Private 2,300 acres, BLM 100 acres (plus 400 acres off-site storage reservoir).	Generating Complex (Figure 8-3) Land Status--Private 2,300 acres, BLM 100 acres (400 acres off-site storage reservoir).	Generating Complex (Figure 8-4) Land Status--Private 1,000 acres, BLM 1,000 acres.
Stack Emissions-- SO_2 14.5 t/d NO_2 81.0 t/d Total suspended particulates (TSP) 5.3	Stack Emissions-- SO_2 14.5 t/d NO_2 81.0 t/d TSP 5.3 t/d	Stack Emissions-- SO_2 17.6 t/d NO_2 82.0 t/d TSP 4.5 t/d
Pollution Control Particulates 99.5 percent SO_2 90.0 percent	Pollution Control Particulates 99.5 percent SO_2 90.0 percent	Pollution Control Particulates 99.5 percent SO_2 90.0 percent
Coal Amount--35 year-life--82 million tons.	Coal Amount--35 year life--82 million tons	Coal Amount--35 year life--92 million tons.
Source--same as proposal.	Source--same as proposal.	Source--Kaiparowits coal fields (see Figure 8-1) underground mining.
Transportation--3 miles by conveyor, 30 miles by truck, and 55 miles by rail (Figure 8-2) to plant site.	Transportation--3 miles by conveyor, 30 miles by truck to plant site (Figure 8-3).	Transportation--by railroad a distance of 190 miles, 137 miles would be new track with a right-of-way of 200 feet (Figure 8-4).
Water Amount--16,000 acre-feet per year.	Water Amount--16,000 acre-feet per year.	Water Amount--16,000 acre-feet per year.
Source--Water would be diverted from the Green River and piped 1 mile to the storage reservoir and then pumped 2 miles to the plant (Figure 8-2).	Source--Water would be pumped to a storage reservoir from the Green River and then would be pumped via a pipeline 66 miles to the plant site (Figure 8-3).	Source--The water source would be the Bonneville Unit of the Central Utah Project which would divert water into the Sevier River drainage. Water for the plant would be diverted from the Sevier River and pumped 5 miles to the plant site.
Transmission Lines Length--177 miles 35 miles--existing double circuit 3 miles--new corridor (130 foot right-of-way [ROW]) 139 miles--paralleling existing libe (100 foot ROW) (Figure 8-2). Land Status--BLM, 49 miles; USFS, 17 miles; USBR, 1 mile; State, 25 miles; Private, 85 miles.	Transmission Lines Length--147 miles 35 miles--existing double circuit 12 miles--new corridor (230 foot ROW) 98 miles--paralleling existing line (100 foot ROW) (Figure 8-3). Land Status--BLM, 29 miles; USFS, 16 miles; USBR, 1 mile; State, 10 miles; Private, 89 miles.	Transmission Lines Length--68 miles 13 miles--new corridor (230 foot ROW) 55 miles--paralleling existing line (100 foot ROW) (Figure 8-4). Land Status--BLM, 16 miles; State, 11 miles; Private, 41 miles.
Voltage--345-kV a.c. line.	Voltage--345-kV a.c. line.	Voltage--345-kV a.c. line.
Labor Force Direct Peak Employment: 1,765 in 1982.	Labor Force Direct Peak Employment: 1,810 in 1982.	Labor Force Plant Site Direct peak employment: 1,410 in 1982.
Direct permanent employment: 838 in 1985.	Direct permanent employment: 840 in 1985.	Direct permanent employment: 328 in 1985.
		Coal Source Direct peak employment: 360 in 1982. Direct permanent employment: 800 1985.

TABLE 8-1

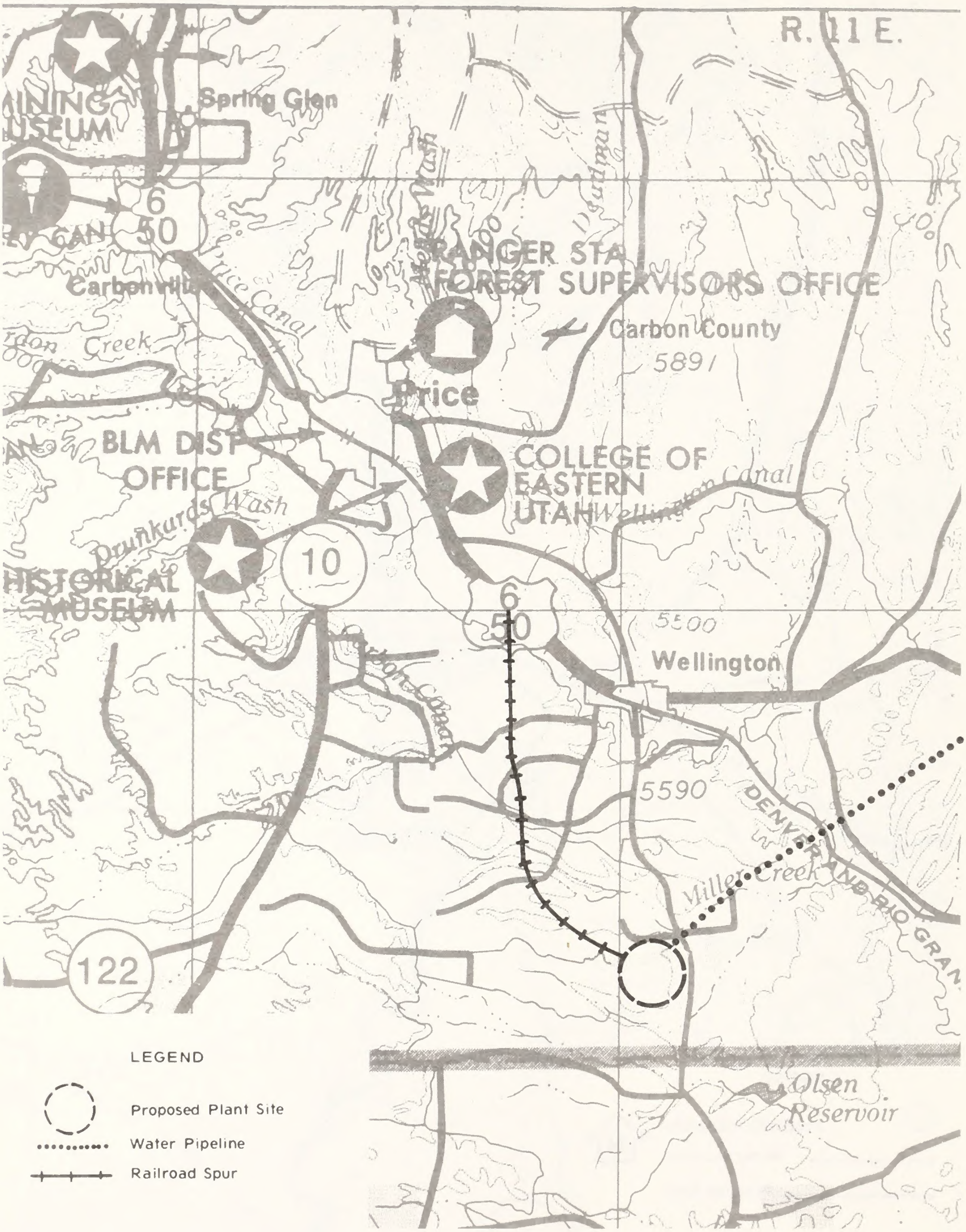
Alternative Site Description

Delta	Soda Springs
Generating Complex (Figure 8-5) Land Status--BLM 1,360 acres, State 640 acres.	Generating Complex (Figure 8-6) Land Status--Private 2,000 acres.
Stack Emission-- SO_2 17.6 t/d NO_2 82.0 t/d TSP 4.5 t/d	Stack Emissions-- SO_2 No emission rates NO_2 have been provided. TSP
Pollution Control Particulates 99.5 percent SO_2 90.0 percent	Pollution Control Particulates 99.5 percent SO_2 90.0 percent
Coal Amount--35 year-life--96 million tons.	Coal Amount--35 year life--114 million tons--800 acres would be mined.
Source--Kaiparowits coal fields (see Figure 8-1).	Source--Gillette coal fields. Strip Mine.
Transportation--Similar to the Nephi alternative.	Transportation--by rail over existing Burlington Northern and Union Pacific to site (Figure 8-6).
Water Amount--16,000 acre-feet per year.	Water Amount--16,000 acre-feet per year.
Source--Similar to for Nephi alternative.	Source--Water would be stored in proposed Caribou and existing Soda Point Reservoirs and delivered to plant site through 9.5 miles of pipeline (Figure 8-6).
Transmission Lines Length--86 miles 40 miles--new corridor (260 foot ROW) 46 miles--paralleling existing line (100 foot ROW) (Figure 8-5). Land Status--BLM, 35 miles; State, 10 miles; Private, 41 miles.	Transmission Lines Length--35 miles 6 miles--new corridor (260 foot ROW). 29 miles--paralleling existing line (100 foot ROW) (Figure 8-6). Land Status--Private, 35 miles.
Voltage--345-kV a.c. line.	Voltage--345-kV a.c. line.
Labor Force	Labor Force
Plant Site Direct peak employment: 1,410 in 1982.	Direct peak employment: 1,825 in 1982.
Direct permanent employment: 328 in 1985.	Direct permanent employment: 483 in 1985.
Coal Source: Same as Nephi alternative.	



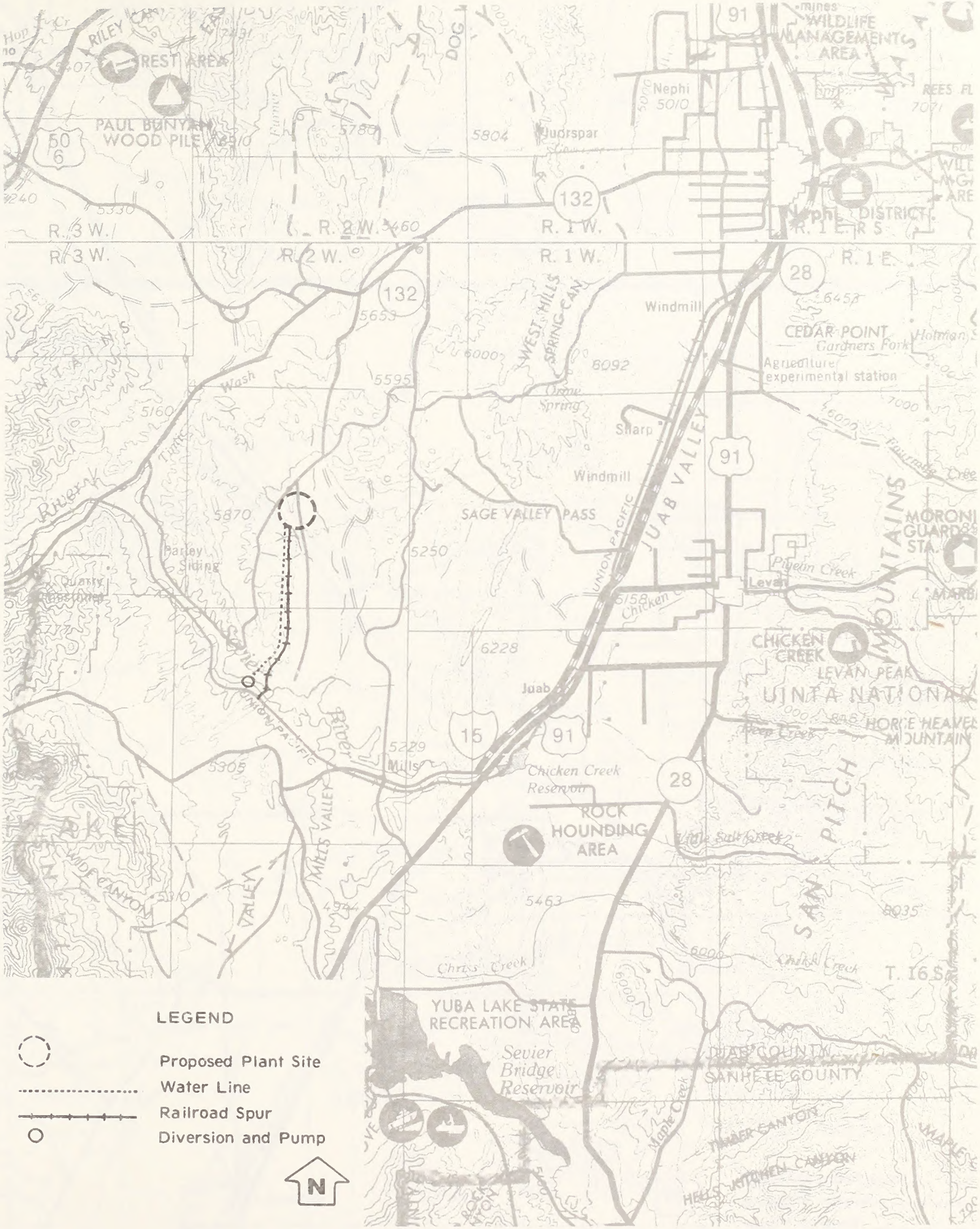
GREEN RIVER ALTERNATIVE SITE

FIGURE 8-2



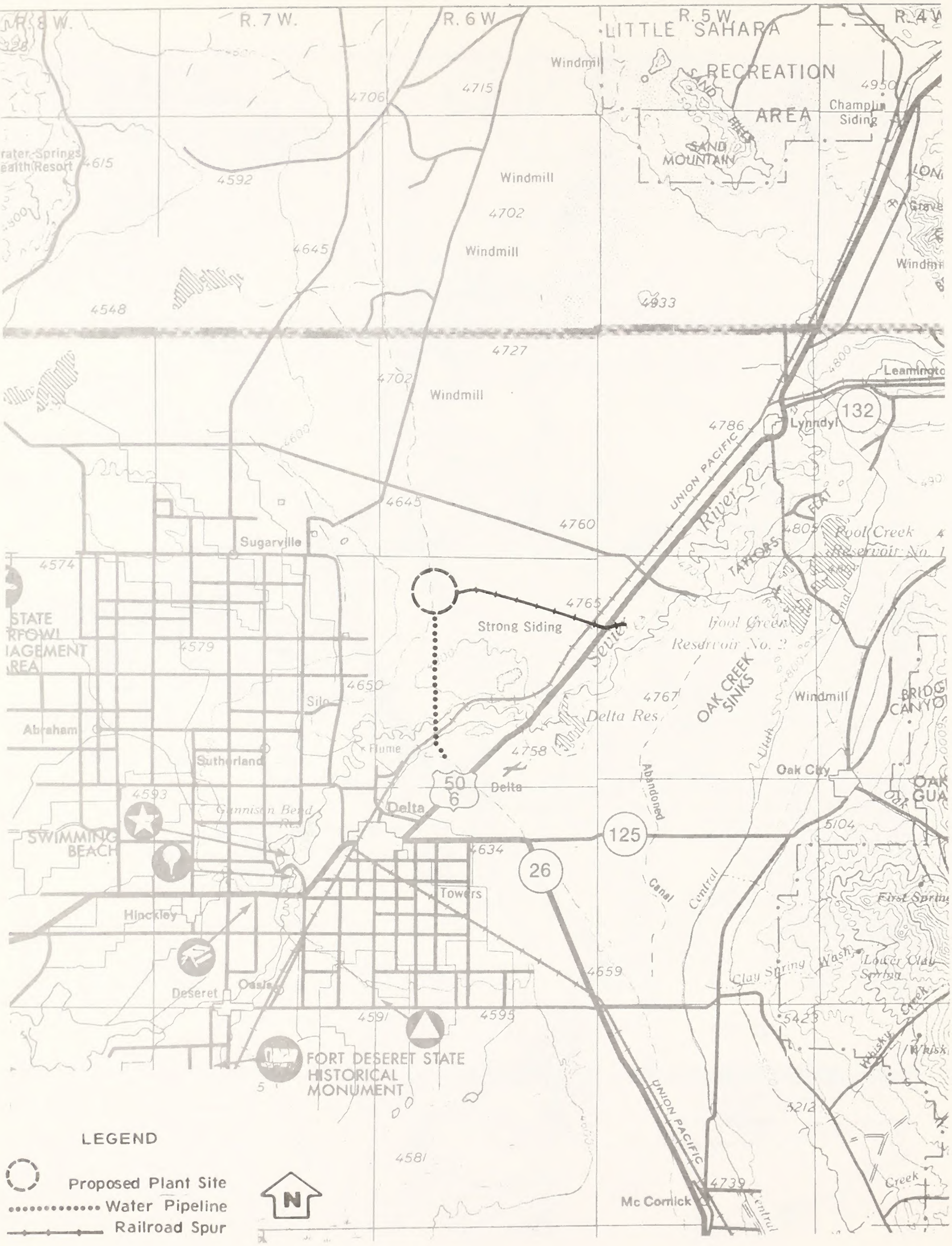
WELLINGTON ALTERNATIVE SITE

FIGURE 8-3



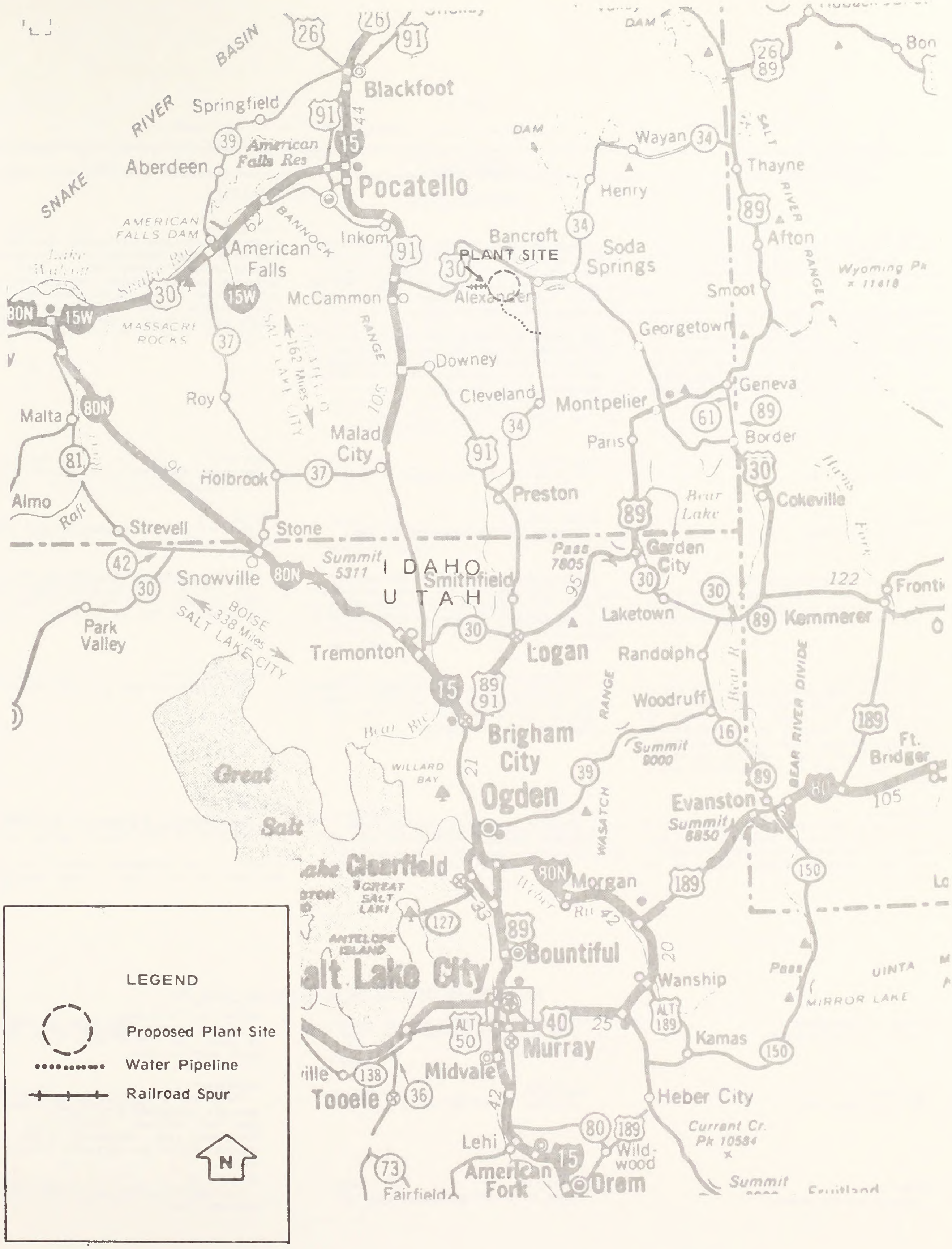
NEPHI ALTERNATIVE SITE

FIGURE 8-4



DELTA ALTERNATIVE SITE

FIGURE 8-5



SODA SPRINGS ALTERNATIVE SITE

FIGURE 8-6

TABLE 8-2

Description of the Environment

	Alternative Sites	
Green River	Wellington	Nephi
	GENERATING COMPLEX	
Air Quality No air quality data are available for the site. However, NAAQS are probably not exceeded except for particulates during periods of high wind. Existing Class I areas near the site are Arches (34 miles) and Canyonlands (30 miles) National Parks. Also, four BLM areas of possible recommendation to the state for Class I reclassification are within 13 miles of the site: Desolation Canyon, Lower Green River, Mexican Mountain, and the San Rafael Reef.	Air Quality There has been no air quality monitoring done at the site. A limited amount of monitoring at Price recorded sulfur dioxide (SO_2) concentrations far below the NAAQS. Maximum 24-hr annual particulate concentrations exceeded the secondary NAAQS. BLM areas of special concern for possible recommendation to the state for Class I, reclassification which could be affected by emissions are: Desolation Canyon and Mexican Mountain.	Air Quality No air quality monitoring has been done at the site. The NAAQS are probably exceeded during periods of high winds. There are elevated terrain features located near the site which include: Canyon Mountain--1,600 feet, 9 miles to the west; Gilson Mountain--3,000 feet, 19 miles to the southwest; Ridge--1,000 feet, 5 miles to the east-southeast.
Vegetation No issue identified.	Vegetation No issue identified.	Vegetation No issue identified.
Animal Life No issue identified.	Animal Life Pheasant habitat is present at site.	Animal Life The site provides habitat for sage grouse and mourning dove.
Cultural and Paleontological Resources One site occurs on the plant site (Sisson, 1978), but it does not qualify for nomination to the National Register of Historic Places.	Cultural and Paleontological Resources One site occurs on the plant site (Sisson, 1978), but it does not qualify for nomination to the National Register of Historic Places.	Cultural and Paleontological Resources Two sites occur at the plant site (Sisson, 1978), but they do not qualify for nomination to the National Register of Historic Places.
Scenic Resources The site is near tourist routes I-70 and US 50-6 as well as the Spotted Wolf Point Overlook on the San Rafael Reef. Areas of special scenic interest include Canyonlands and Arches National Parks, Desolation Canyon, the Lower Green River, and the entire San Rafael Swell. All have outstanding scenic qualities.	Scenic Resources The site is near the scenic Wasatch Plateau and near highways US 50-6 and U-10. Areas of special scenic interest are the same as identified for the proposal.	Scenic Resources No issue identified.
Land Uses The site is less than 1 mile from the Green River Airport which is presently under construction. Two county roads pass through the site, and livestock grazing occurs on the site.	Land Uses The site is used for pasture (1,500 acres) and some irrigated agriculture (500 acres).	Land Uses Approximately 1,000 acres is dry farmed and 1,000 acres is rangeland.
	COAL SOURCE AND TRANSPORTATION	
Geology and Topography Same as for the proposal.	Geology and Topography Same as for the proposal.	Geology and Topography The coal source lies under about 500 feet of cover. An area of about 4,000 to 5,000 acres would be mined.
Vegetation No issue identified.	Vegetation No issue identified.	Vegetation There are 7 possibly endangered and 16 possibly threatened plant species along the coal haul railroad. Appendix VIII-1 lists threatened and endangered plants. See Appendix VIII-2 for vegetation along railroad route.
Animal Life Same as for the proposal.	Animal Life Same as for the proposal.	Animal Life See Appendix VIII-2 for animal life along railroad route.

TABLE 8-2

Description of the Environment

Alternative Sites	
Delta	Soda Springs
GENERATING COMPLEX	
Air Quality The only ambient air quality data for the area consist of particulate measurements made in August, 1977, which showed a maximum 24-hour average particulate concentration of 187 $\mu g/m^3$ which exceeds the NAAQS of 150 $\mu g/m^3$. The high particulate concentrations were probably caused by wind blown dust.	Air Quality Phosphate development near Conda, Idaho, north of Soda Springs, is producing high annual average and short-term SO_2 concentrations. The annual average SO_2 concentrations are about two-thirds of the NAAQS and short-term concentrations, at times, are very near the NAAQS. Although the plant site is in an attainment area, nearby Soda Springs has been declared a non-attainment area for particulates. The State of Idaho is presently trying to determine if the major particulate impact is from wind blown (fugitive) dust or from industrial sources.
Vegetation One possibly threatened plant species could occur at the plant site (see Appendix VIII-1).	Vegetation No issue identified.
Animal Life No issue identified.	Animal Life Hungarian partridge and mourning doves are found at the plant site.
Cultural and Paleontological Resources No issue identified.	Cultural and Paleontological Resources There are visible portions of the Oregon Trail about 1 mile northeast of the site. This trail is eligible for nomination to the National Register of Historic Places (Johnson, 1978).
Scenic Resources The site would be near U.S.-50.	Scenic Resources The proposed site is near U.S. 30N.
Land Uses The plant site would occupy 2,000 acres of range used by cattle. The Little Sahara Recreation Area, a visually sensitive area, is about 12 miles from the site.	Land Uses The plant site would occupy 2,000 acres of dryland barley with sagebrush islands. The Petticoat Peak BLM Roadless Inventory Unit is about 6 miles from the site.
COAL SOURCE AND TRANSPORTATION	
Geology and Topography Same as for the Nephi site.	Geology and Topography Coal would be obtained from an existing strip mine in the Gilette, Wyoming coal fields.
Vegetation Same as for Nephi site.	Vegetation No issue identified.
Animal Life Same as for the Nephi site.	Animal Life No issue identified.

TABLE 8-2 (continued)

	Alternative Sites	
Green River	Wellington	Nephi
	COAL SOURCE AND TRANSPORTATION (continued)	
Cultural and Paleontological Resources No Issue identified.	Cultural and Paleontological Resources No issue identified.	Cultural and Paleontological Resources There are 23 cultural sites along the coal haul railroad (Hauck, 1978b, 1978c), none of which are eligible for nomination to the National Register of Historic Places (see Appendix VIII-2).
Minerals Same as for the proposal.	Minerals Same as for the proposal.	Minerals There are approximately 5 billion tons of recoverable coal in the Kaiparowits Plateau coal field (Doelling, 1972).
Scenic Resources Same as for the proposal.	Scenic Resources Same as for the proposal.	Scenic Resources The railroad would pass by or through seven areas of high visual sensitivity. The Kaiparowits Plateau area is of major concern to environmentalists. The railroad would cross U.S.-89 and I-15, important tourist routes (see Appendix VIII-2).
Land Uses Same as for the proposal.	Land Uses Same as for the proposal.	Land Uses The railroad would pass by or through three recreation areas. The coal source would be located within and the railroad would cross within BLM roadless inventory units UT-040-075 and UT-040-076.
	WATER SOURCE	
Vegetation No issue identified.	Vegetation Appendix VIII-3 shows vegetation types along the proposed water supply pipeline route. Four possibly endangered plants species could occur along the water pipeline in the Cat Canyon area (see Appendix VIII-1).	Vegetation No issue identified.
Animal Life The endangered Colorado River squawfish and humpback chub, the proposed endangered bonytail chub, and the proposed threatened razorback sucker inhabit the Green River in the primary influence zone (McAda, 1977).	Animal Life The endangered Colorado River squawfish and humpback chub, the proposed endangered bonytail chub and the proposed threatened razorback sucker inhabit the Green River in the secondary influence zone (McAda, 1977).	Animal Life No issue identified.
Cultural and Paleontological Resources No issue identified.	Cultural and Paleontological Resources Fossil remains are located within the Morrison Formation (Miller, 1978a, 1978b).	Cultural and Paleontological Resources No issue identified.
Scenic Resources The Lower Green River is an important visual area.	Scenic Resources Same as for Green River, except the pipeline would parallel U.S. 50-6. Several power lines and a railroad are located in the area (see Appendix VIII-3).	Scenic Resources No issue identified.
Land Uses The reservoir would inundate a county road which provides access to part of Canyonlands National Park. The Lower Green River is important for floatboating.	Land Uses Same as for Green River.	Land Uses No issue identified.

TABLE 8-2 (continued)

Alternative Sites	
Delta	Soda Springs
COAL SOURCE AND TRANSPORTATION (continued)	
Cultural and Paleontological Resources There are 15 cultural sites along the coal haul railroad (Hauck, 1978b, 1978c), none of which are eligible for nomination to the National Register of Historic Places (see Appendix VIII-2).	Cultural and Paleontological Resources No issue identified.
Minerals Same as for the Nephi site.	Minerals There are approximately 12 billion tons of recoverable coal in the Eastern Powder River Coal Basin which could be strip mined (USDA, 1974).
Scenic Resources Same as Nephi.	Scenic Resources No issue identified.
Land Uses Same as for the Nephi site.	Land Uses No issue identified.
WATER SOURCE	
Vegetation No issue identified.	Vegetation No issue identified.
Animal Life No issue identified.	Animal Life The proposed Caribou Reservoir would occupy approximately 3,000 acres of riparian habitat utilized as nesting and brooding areas for Canada geese, ducks, greater sandhill cranes, and other marshland birds. In addition, bald eagles winter along this section of the river (IDFG, 1978).
Cultural and Paleontological Resources No issue identified.	Cultural and Paleontological Resources No issue identified.
Scenic Resources No issue identified.	Scenic Resources No issue identified.
Land Uses No issue identified.	Land Uses No issue identified.

TABLE 8-2 (continued)

	Alternative Sites	
Green River	Wellington	Nephi
	TRANSMISSION LINES	
Appendix VIII-4 is an environmental profile of the transmission line route. Between Huntington and Camp Williams, the transmission lines for Green River would follow the same route as described for the proposed action (Chapters 1 and 2). Only the lines from Green River to the existing corridor at Huntington are described here.	Appendix VIII-5 is an environmental profile of the proposed transmission line route. Between Huntington and Camp Williams, the transmission lines would follow the same route as described for the proposed action (Chapters 1 and 2). Only the lines from Wellington to the existing corridor will be described here.	Appendix VIII-6 is an environmental profile of the proposed transmission line route.
Vegetation Six possibly endangered or threatened plant species could occur along the route.	Vegetation Three possibly endangered species could occur along the route.	Vegetation Two possibly threatened species could occur along the route.
Animal Life The Buckhorn Flat area is possible black-footed ferret habitat.	Animal Life No issue identified.	Animal Life See Appendix VIII-6.
Cultural and Paleontological Resources One site occurs along the route (Sisson, et. al., 1978; Sisson and Burnett, 1978), but is not eligible for nomination to National Register Historic Places.	Cultural and Paleontological Resources No issue identified.	Cultural and Paleontological Resources Two sites occur along the route (Hauck, 1978a), neither are eligible for nomination to the National Register of Historic Places.
Scenic Resources The line would be near the Cedar Mountain Overlook and a major recreation access route to the San Rafael Swell. One line already crosses the area. The line would cross one state and one federal highway. Lines presently exist at all crossings.	Scenic Resources The line would cross Highway U-10.	Scenic Resources The line would cross two state highways and one federal highway. Lines presently exist at all but one crossing.
Land Uses The transmission line would cross within BLM Roadless Inventory Unit Ut-060-054.	Land Uses No issue identified.	Land Uses No issue identified.
	INFLUENCE ZONE	
Vegetation There are 19 possibly endangered and 17 possibly threatened species in the influence zone.	Vegetation There are 19 possibly endangered and 17 possibly threatened species in the secondary influence zone.	Vegetation Five species of possibly endangered plants and 11 species of possibly threatened plants occur in the influence zone.
Animal Life Same as for the proposal.	Animal Life Same as for the proposal.	Animal Life Oak, Chalk, and Corn Creeks are located in the influence zone. Clear Lake, a waterfowl area, is located in the region. In addition, deer, elk, and upland game birds are found in the region.
Cultural and Paleontological Resources Similar to the proposal.	Cultural and Paleontological Resources Same as for the proposal.	Cultural and Paleontological Resources Similar to proposal.
Land Uses The influence zone contains the following areas with potential for special designation: 1) two National Park Service areas having administratively endorsed wilderness proposals; 2) approximately 41 BLM Roadless Inventory Units (portions of two have been recommended for Wilderness Study Area status), one BLM designated Natural Area (Instant Study Area), five BLM areas with potential for primitive area designation, and one BLM area with potential for Natural Area designation; and 4) three rivers with potential for Wild and Scenic River Designation.	Land Uses Same as for the proposal.	Land Uses The influence zone contains the following areas with potential for special designation: 1) one designated Wilderness Area; 2) three Forest Service RARE II areas recommended for further planning; and 3) one BLM Wilderness Study Area, two BLM roadless inventory units, and two BLM areas identified as having potential for natural area designation.

TABLE 8-2 (continued)

Alternative Sites	
Delta	Soda Springs
TRANSMISSION LINES	
Appendix VIII-7 is an environmental profile of the proposed route.	Appendix VIII-8 is an environmental profile of the proposed route.
Vegetation One possibly threatened plant species could occur along the route.	Vegetation No issue identified.
Animal Life See Appendix VIII-7.	Animal Life See Appendix VIII-8.
Cultural and Paleontological Resources There are nine sites along the route (Hauck, 1978a), but none are eligible for nomination to the National Register of Historic Places.	Cultural and Paleontological Resources No issue identified.
Scenic Resources The line would cross three state highways and one federal highway. Lines presently exist at two of the crossings. The line would cross the Little Sahara Recreation area, a visually sensitive area.	Scenic Resources Line would cross Oneida Narrows, a scenic, visually sensitive area. Several lines already cross the area. The line would cross one state and one federal highway. Lines already exist at the State Highway crossing.
Land Uses No issue identified.	Land Uses No issue identified.
INFLUENCE ZONE	
Vegetation Five species of possibly endangered and 11 species of possibly threatened plants are in the influence zone (Appendix VIII-1).	Vegetation One species of possibly endangered and five species of possibly threatened plants are located in the influence zone (Appendix VIII-1).
Animal Life Oak, Chalk, and Corn Creeks are located in the influence zone. Clear Lake, a waterfowl management area, is located in the region. In addition, deer, elk, and upland game birds are found in the region.	Animal Life Elk, moose, deer, small mammals, waterfowl, upland game birds, and several coldwater fish species are in the influence zone. The endangered whooping crane is found at Gray's Lake National Wildlife Refuge, 34 miles north of Soda Springs.
Cultural and Paleontological Resources Similar to proposal.	Cultural and Paleontological Resources Similar to proposal.
Land Uses The influence zone contains the following areas with potential for special designation: 1) two Forest Service RARE II areas recommended for further planning; 2) five BLM roadless inventory units, five BLM Wilderness Study Areas, one BLM area identified as having potential for primitive area designation, and two BLM areas identified as having potential for Natural area designation.	Land Uses The influence zone contains the following areas with potential for special designation: 1) five Forest Service RARE II areas recommended for wilderness or further planning; 2) approximately 32 BLM roadless inventory units (four of which are less than 5,000 acres but contiguous to a RARE II area, and 23 of which are small islands; and 3) one river that has been identified as having potential for Wild and Scenic River designation.

TABLE 8-2 (concluded)

	Alternative Sites	
Green River	Wellington	Nephi
	INFLUENCE ZONE (continued)	
Coal Source--Influence Zone Same as for the proposal.	Coal Source--Influence Zone Same as for the proposal.	Coal Source--Influence Zone There are 60 possibly threatened and 31 possibly endangered plant species, as well as one officially listed threatened species (Astragalus perianus) in the influence zone (see Appendix VIII-1). Many small lakes and streams are located on the Boulder Mountain north of Escalante, Utah. Streams and lakes contain rainbow, brook, and cutthroat trout. Game animals include deer, waterfowl, upland game birds, and small game mammals. Recent transplants of elk and antelope have been made. The Dixie National Forest and Bryce Canyon National Park are primary recreation areas. The influence zone contains: 1) three National Park Service wilderness proposals; 2) four Forest Service RARE II areas recommended for wilderness or further planning; 3) six BLM Natural or Primitive areas and about 38 BLM roadless inventory units; and 4) one river having potential for Wild and Scenic River designation.
	HUMAN RESOURCES	
The following are the current conditions:	The following are the current conditions:	The following are the current conditions:
Employment Carbon, Emery, and Grand Counties 13,124 people	Employment Carbon and Emery Counties 10,303 people	Employment Juab County 1,932 people Garfield County 1,404 people
Population Green River 966 people Moab 4,500 people Price River Valley 15,093 people Castle Valley 5,618 people	Population Price River Valley 15,093 people Castle Valley 5,618 people	Population Juab County 5,000 people Garfield County 3,300 people
Income (1975 dollars) Carbon, Emery, and Grand Counties Earnings: $125 million Personal Income: $159 million	Income (1975 Dollars) Carbon and Emery Counties Personal Income: $128 million	Income (1975 Dollars) Personal Income $30.3 million
Housing Green River 394 units Moab 1,560 units Price River Valley 3,569 units Castle Valley 2,007 units	Housing Price River Valley: 3,569 units Castle Valley: 2,007 units	Housing Juab County 1,055 units Garfield County 1,216 units
Education Moab 1,879 students 93 percent of capacity Carbon County 4,300 students 93 percent of capacity Emery County 2,635 students 82 percent of capacity	Education (subject to change) Carbon County 4,300 students 93 percent of capacity Emery County 2,635 students 82 percent of capacity	Education Juab County 1,044 students 87 percent of capacity Garfield County 194 students 35 percent of capacity
Water Supply Capability Green River 1,250 people Moab 16,000 people Price River Valley 23,000 people Castle Valley 11,230 people	Water Supply Capacity Price River Valley 23,000 people Castle Valley 11,230 people	Water Supply Capacity Juab County 19,000 people Garfield County 2,203 people
Sewer System Capacity Green River 1,600 people Moab 10,000 people Price River Valley 24,000 people Castle Valley 5,800 people	Sewer System Capacity Price River Valley 24,000 people Castle Valley 5,800 people	Sewer Design Capacity Juab County 10,000 people Garfield County none
Medical Green River 1 clinic, 1 nurse practitioner Moab 38 bed hospital, 3 physicians, 3 dentists	Medical Price River Valley 75 bed hospital, 12 physicians, 11 dentists Castle Valley 1 clinic, 3 physicians, 2 dentists	Medical Juab County 31 bed hospital, 3 physicians, 2 dentists Garfield County 1 clinic

TABLE 8-2 (concluded)

Alternative Sites	
Delta	Soda Springs
INFLUENCE ZONE (continued)	
Coal Source--Influence Zone Same as for the Nephi Site.	Coal Source--Influence Zone No issue identified.
HUMAN RESOURCES	
The following are the current conditions (For Garfield County data, see Nephi Site):	The following are the current conditions:
Employment Millard County 3,399 people	Employment Caribou County 4,261 people
Population Millard County 7,900 people	Population Caribou County 7,800 people
Income (1975 Dollars) Personal Income $40.9 million	Income (1975 Dollars) Caribou County Personal Income $43.4 million
Housing Millard County 1,859 units	Housing Caribou County 20,873 units
Education Millard County 1,241 students 86 percent of capacity	Education Caribou County 1,138 students 81 percent capacity
Water Supply Capacity Millard County 878 people	Water Supply Capacity Soda Springs 6,900 people Bancroft 3,560 people Grace 1,100 people
Sewer Design Capacity Millard County 4,700 people	Sewer Design Capacity Soda Springs 6,340 people Bancroft none Grace 1,100 people
Medical Millard County 32 bed hospital 2 physicians 1 dentist	Medical 33 bed hospital 5 physicians 3 dentists.

TABLE 8-3

Impact Analysis

Alternative Sites Green River	 Wellington	 Nephi
AIR QUALITY		
The plant would emit 14.5 tons of SO_2, 81.0 tons of NO_2, and 5.3 tons of particulates per day. The NAAQS and probably PSD incremental increases at Class II and existing Class I areas would be met. It is probable that PSD standards would be violated at one or more BLM areas of special concern should they obtain Class I status (Bowers, 1978). Even though incremental limitation at the existing Class I areas of Arches (34 miles from site) and Canyonlands National Park (30 miles from site) would probably be met, some impairment to visibility from visual range degradation and atmospheric discoloration might be expected. However, until visibility regulations are promulgated by EPA, the significance of any impairment is unknown.	The plant would emit 14.5 tons of SO_2, 81.0 tons of NO_2, and 5.3 tons of particulates per day. Emissions from the plant would meet NAAQS and PSD standards at Class II and existing Class I areas. Should any nearby BLM areas of special interest obtain Class I status, it is possible that PSD visibility or incremental increase standards would be exceeded (Bowers, 1978). Some visibility degradation would occur as a result of emissions.	The plant would emit 17.6 tons of SO_2, 82.0 tons of NO_2, and 4.5 tons of particulates per day. At least 1 year of on site meteorological data are required before a detailed analysis of impact can be made. However, using qualitative judgements, the complexity of the terrain in the vicinity of the Nephi site could limit the size of a power plant that would meet the requirements of the PSD regulations (Bowers, 1978). Some visibility degradation would result.
GEOLOGY AND TOPOGRAPHY		
Same as proposal.	Same as proposal.	The mining of coal for the power plant could result in subsidence on 4,000 to 5,000 acres. Maximum subsidence expected to occur would be from 1 to 5 feet. If subsidence caused severe fracturing of the strata, two springs could be damaged in their water transporting ability (USDI, 1977).
VEGETATION		
Six possibly threatened or endanagered plant species could be reduced in numbers or have some of their essential habitat destroyed by construction of the transmission line from Green River to Huntington Essential habitat for possibly threatened and endangered flora within the influence zone could be damaged by increased recreational use (e.g., ORV). Some plants could be destroyed, and some species (such as cactus) might be taken by collectors. Impact magnitude cannot be assessed, but is expected to be slight. It is not expected than any species would become extinct. It is possible that a species could be destroyed locally. Impacts to riparian vegetation would be the same as under the proposal.	Four possibly endangered plant species could be reduced in numbers or have some of their essential habitat destroyed by pipeline construction on the Cat Canyon area. Essential habitat for possibly threatened and endangered flora within the influence zone could be damaged by increased recreational use (e.g., ORV). Some plants could be destroyed, and some species (such as cactus) might be taken by collectors. Impact magnitude cannot be assessed, but is expected to be slight. It is not expected that any species would become extinct. It is possible that a species could be destroyed locally. Impact to riparian vegetation would be the same as under the proposal.	Twenty-three possibly threatened and endangered species could be reduced in numbers, or some of their essential habitat could be destroyed by construction of the railroad and transmission line. Essential habitat for possibly threatened and endangered species and one officially listed threatened species within the influence zones at the plant site and coal mine area could be damaged by increased recreational use (e.g., ORV). Some plants could be destroyed, and some species (such as cactus) might be taken by collectors. Impact magnitude cannot be assessed, but is expected to be slight. It is not expected that any species would become extinct. It is possible that a species could be destroyed locally.
WATER RESOURCES		
Subsidence following mining operations could intercept ground water aquifers above the mined area. Springs and other surface waters could be affected. The magnitude of this impact cannot be determined.	Subsidence following mining operations could intercept ground water aquifers above the mined area. Springs and other surface waters could be affected. The magnitude of this impact cannot be determined.	Subsidence over the coal leases could alter the flow of water from Rock and Oak Springs in Alvey Wash, with the possible loss of an unknown amount of surface discharge (USDI, 1976).

TABLE 8-3

Impact Analysis

Alternative Sites		
Delta	Soda Springs	Proposed Site
	AIR QUALITY	
The plant would emit 17.6 tons of SO_2, 82.0 tons of NO_2, and 4.5 tons of particulates per day. The emissions from the plant would meet both the NAAQS and the PSD standards (Bowers, 1978). Visibility degradation would occur as a result of emissions from the plant.	Sulfur Dioxide emissions could add to the already high SO_2 concentrations in the Conda area. Particulate emissions could add to the violations of the NAAQS for particulates. However, this would not be significant if it is determined that the violations are due to windblown dust.	The plant would emit 12.5 tons of SO_2, 70 tons of NO_2, and 4.6 tons of particulates per day. The plant would meet the NSPS, NAAQS, and the PSD requirements. Some reduction in visibility in the region could result.
	GEOLOGY AND TOPOGRAPHY	
Same as for Nephi.	Mining would occur at an existing strip mine in the Gillette, Wyoming coal field.	Subsidence, up to a maximum of 10 feet, could occur on the lease area. Exactly when subsidence would occur cannot be determined.
	VEGETATION	
Same as for Nephi, except that one additional possibly threatened plant species occurs along the transmission line.	Essential habitat for possibly threatened and possibly endangered flora within the influence zone could be damaged by increased recreational use (e.g., ORV). Some plants could be destroyed and some species (such as cactus) might be taken by collectors. Impact magnitude cannot be assessed, but it is expected to be slight. It is not expected that any species would become extinct. It is possible that a species could be destroyed locally.	One species of possibly endangered plant could be reduced in numbers or some of its essential habitat could be destroyed by construction of the transmission line. One endangered plant species could be destroyed. Essential habitat for possibly threatened and possibly endangered flora within the influence zone could be destroyed and some species (such as cactus) might be taken by collectors. Impact magnitude cannot be assessed, but is expected to be slight. It is not expected that any species would become extinct. It is possible that a species could be destroyed locally. About 1,400 feet of riparian vegetation would be lost along Cottonwood Creek where a culvert is proposed near the Cottonwood portal.
	WATER RESOURCES	
Same as for Nephi.	No issue identified.	A maximum of 14,000 acre-feet of water per year would be converted from agricultural use to industrial use. Subsidence following mining operations could intercept ground water aquifers above the mined area. Springs and other surface waters could be affected. The magnitude of this impact cannot be determined.

TABLE 8-3 (continued)

	Alternative Sites	
Green River	Wellington	Nephi
	ANIMAL LIFE	
Plant Site: No issue identified.	Plant Site: Agricultural lands, which support pheasants, would be cleared.	Plant Site: 1,000 acres of sage grouse wintering areas could be cleared. Feeding and nesting areas for mourning doves would be lost at the plant site.
Coal Supply: Same as for the proposal.	Coal Supply: Same as for the proposal.	Coal Supply: Construction of the coal transport railroad from the Kaiparowits coal fields could: (1) cause destruction and deterioration of 28 miles of trout habitat in the East Fork of the Sevier River between milepost 50 and 78. Trout numbers and reproduction would be diminished. (2) result in deer losses if construction proceeded along 30 miles of critical deer wintering areas (Mileposts 12-22, 37-43, 55-60, and 78-87) from November 1 to April 30. (3) result in the loss of three sage grouse strutting grounds near Widtsoe. Construction activities and train disturbance could cause these areas to be abandoned and grouse production to be reduced. (4) cause disturbance and destruction along 45 miles of waterfowl nesting, moulting, and feeding habitat along the East Fork of the Sevier River and along the Sevier River between mileposts 55 to 83 and 155 to 170. Lost production and reduced waterfowl numbers could be expected. (5) result in harassment by construction crews to bald and golden eagles in Johns Valley. (6) result in losses of an unknown number of the endangered Utah prairie dog if railroad construction proceeded across prairie dog colonies in John's Valley. Train travel and periodic railway maintenance would subject deer, waterfowl, and other wildlife to disturbance in areas not presently subjected to disturbance. In addition, trains could collide with deer, especially in wintering areas. As a result of subsidence, the surface discharge of both Rock and Oak Springs could be reduced or eliminated. This would cause loss of deer, small mammals, etc., from an area of otherwise suitable habitat. The number of individuals or wildlife species affected is not known.
Water supply: The endangered Colorado River squawfish and humpback chub, the proposed endangered bonytail chub, and the proposed threatened razorback sucker inhabit the portion of the Green River where water would be removed for plant operation. Effects of a maximum decrease of 5 percent in Green River flow below the water takeout on these species cannot be assessed.	Water Supply: Same as for Green River.	Water Supply: No issue identified.

TABLE 8-3 (continued)

Alternative Sites		
Delta	Soda Springs	Proposed Site
	ANIMAL LIFE	
Plant Site: No issue identified.	Plant Site: 2,000 acres of Hungarian partridge and mourning dove habitat could be lost. Effect on these two species is unknown.	Plant Site: No issue identified.
Coal Supply: Same as for Nephi.	Coal Supply: No issue identified.	Coal Supply: Construction of the conveyor and surface facilities in Cottonwood Canyon would disrupt deer migration routes and disturb crucial deer wintering areas resulting in an undetermined loss of deer. Loss of springs on East Mountain as a result of subsidence would result in lost habitat and reduced numbers of all wildlife utilizing springs as a source of water. A 300 to 400 percent increase in the traffic in Cottonwood Canyon would increase deer deaths due to vehicle-deer collisions. A minimum of four deer would be killed yearly.
Water Supply: No issue identified.	Water Supply: The proposed Caribou Reservoir would inundate and destroy 10.5 miles of riparian habitat (approximately 3,000 acres) utilized as nesting areas by approximately 35 pairs of Canada geese (150 young produced annually), three pairs of greater sandhill cranes, an unknown number of duck (mainly mallards), and other marshland birds. Most nesting and brood rearing habitat, and its waterfowl production, would be lost. Wintering bald eagles would be adversely affected as the river is impounded. Feeding areas would be reduced after the reservoir freezes.	Water Supply: Change in water use from agricultural to industrial use could retire as much as 3,415 acres of farmland which would result in a loss of approximately 900 breeding pheasants and their annual production of 2,000 young.

TABLE 8-3 (continued)

	Alternative Sites	
Green River	Wellington	Nephi
	ANIMAL LIFE (continued)	
Transmission Line: Same as proposal with the addition of possible disturbance to black-footed ferrets in Buckhorn Flat. Sighting of black-footed ferrets are unconfirmed.	Transmission Line: Same as for the proposal.	Transmission Line: Transmission line construction in Cedar Valley could adversely affect wintering bald eagles through harassment. Transmission line construction in Sage and Dog Valley would cause loss of sage grouse production if it passed through strutting and nesting grounds between March 15 and May 30. Exact locations of strutting grounds in these areas are unknown. Transmission structures placed in the vicinity of sage grouse strutting grounds would create perches for raptors which would prey on the strutting grouse with greater proficiency. Abandonment of these strutting grounds could result.
Work Force: Similar to the proposal.	Work Force: Same as for the proposal.	Work Force: Similiar to proposal, but in the Nephi area.
	CULTURAL AND PALEONTOLOGICAL RESOURCES	
On-Site Damage: Potential damage to one known site at the plant site.	On-Site Damage: The six sites known to exist in the proposed transmission line corridor and the one site located on the plant complex could be damaged. There is a possibility of destroying highly important paleontological remains in the Morrison Formation during pipeline construction.	On-Site Damage: There is a potential of damaging two sites at the generating complex, 23 sites along the railroad line, and two sites along the transmission line corridor.
Illegal Use: Increased vandalism to both cultural and paleontological values would result from the increased population and new access brought about by the proposed actions. Many archaeological sites are known to exist in the influence zone. Illegal collecting of artifacts would mean a loss in the scientific understanding of ancient cultural activities in the area. Similar impacts would occur to paleontological resources. The impact significance is unknown.	Illegal Use: Increased vandalism to both cultural and paleontological values would result from the increased population and new access brought about by the proposed actions. Many archaeological sites are known to exist in the influence zone. Illegal collecting of artifacts would mean a loss in the scientific understanding of ancient cultural activities in the area. Similiar impacts would occur to paleontological resources. Impact significance is unknown.	Illegal Use: Increased vandalism to both cultural and paleontological values would result from the increased population and new access brought about by the proposed actions. Many archaeological sites are known to exist in the influence zone. Illegal collecting of artifacts would mean a loss in the scientific understanding of ancient cultural activities in the area. Similar impacts would occur to paleontological resources. The impact significance is unknown.

TABLE 8-3 (continued)

Alternative Sites		
Delta	Soda Springs	Proposed Site
	ANIMAL LIFE (continued)	
Transmission Line: Same as for Nephi.	Transmission Line: Loss to deer could occur if construction activities were conducted in Oneida Canyon between November 1 and April 30.	Transmission Line: Losses of deer and elk could occur if they are disturbed along 48 miles of essential winter range between November 1 and May 30. Additional losses could occur if fawning-calving areas were disturbed between May 15 and July 15. Disturbance to sage grouse on strutting ground between March 15 and May 30 would result in lost production. Disturbance on moose wintering and calving areas between November 1 and July 15 would adversely affect the moose population. Disturbance on Provo Bay and Powell Slough from March 1 to July 31 would cause loss of production to waterfowl and other marshland birds. The transmission line would pass through bald eagle wintering areas in Gordon Creek and Spanish Fork Canyon. Harassment by construction crews could be detrimental.
Work Force: Similar to the proposal, except in the Delta area.	Work Force: Similar to proposal, but in the Soda Springs area. It is not expected that the endangered whooping crane would be affected in the influence zone.	Work Force: Increased human populations would result in losses to all wildlife due to displacement, inadvertant and intentional kills, and harassment. Increased hunting and fishing pressure due to the larger human population would most adversely affect game animals in the influence zone.
	CULTURAL AND PALEONTOLOGICAL RESOURCES	
Same as for Nephi, except no archaeological values have been found at the plant site.	On-Site Damage: The plant complex would detract from the character of the nearby Oregon Trail.	On-Site Damage: Damage could occur to six sites along the transmission line corridor. Also, damage to subsurface sites not discovered during initial surveys, could occur through ground disturbance during construction. There is a possibility of destroying highly important paleontological remains in the Green River and North Horn Formation during construction of the transmission line.
	Illegal Use: Increased vandalism to both cultural and paleontological values would result from the increased population and new access brought about by the proposed actions.	Illegal Use: Increased vandalism to both cultural and paleontological values would result from the increased population and new access brought about by the proposed action.
	Many archaeological sites are known to exist in the influence zone. Illegal collecton of artifacts would mean a loss in the scientific understanding of ancient cultural activities in the area. Similar impacts would occur to paleontological resources. The impact significance is unknown.	Many archaeological sites are known to exist in the influence zone. Illegal collecting of artifacts would mean a loss in the scientific understanding of ancient cultural activities in the area. Similar impacts would occur to paleontological resources. The impact significance is unknown.

TABLE 8-3 (continued)

	Alternative Sites	
Green River	Wellington	Nephi
	SCENIC RESOURCES	
The plant site would degrade the view from the Spotted Wolf Point Overlook on the San Rafael Reef. The contrast of the site would be high from Highways I-70 and US 50-6. Coal source impacts would be the same as those for the proposed action. The intake for the water system would degrade the pristine character of the lower Green River. The presence of an additional transmission line would degrade the view from Cedar Mountain and in the Buckhorn Flat area. An additional transmission line at highway crossings would create little additional contrast. The presence of additional transmission lines at the month of Spanish Fork Canyon would somewhat degrade the aesthetics of the area, but would add little to the present man-made contrast. Any atmospheric discoloration or reduction in visual range would degrade the scenic quality at areas of scenic interest. The extent of impact is not known.	The plant site would be obvious from the Wasatch Plateau. The contrast of the site would be high from adjacent highways. Coal source impacts would be the same as those for the proposed action. The intake for the water system has the same impact as the Green River alternative. A new line crossing U-10 would create high contrast. The presence of additional transmission lines at the mouth of Spanish Fork Canyon would somewhat degrade the aesthetic appeal of the area, but would add little to the present man-made contrast. Any atmospheric discoloration or reduction in visual range would degrade the scenic quality at areas of special scenic interest. The extent of impact is not known.	The presence of the railroad would create high to moderate man-made contrast and would degrade the aesthetic appeal of seven visually sensitive areas. This is particularly true of the remote Kaiparowits Plateau area. The railroad crossing of U.S. 89 and I-15 would create high contrast. At highway crossings, where initial transmission lines would be located, man-made contrast would be high. At highway crossings where new transmission lines would be added to existing lines, additional man-made contrast would be low.
	MINERALS	
Eighty-two million tons of coal would be mined and used in power generation. Estimated coal remaining in the mine, lost to recovery, would be 56 million tons. This is a total loss of 138 million tons of nonrenewable coal reserves. This amount represents about 2 percent of the known coal reserves in the Wasatch Plateau coal field.	Same as the Green River site.	Ninety-two million tons of coal would be mined and used in power generation. Estimated coal remaining in the mine lost to ultimate recovery would be 61 million tons. This is a total loss of 153 million tons of nonrenewable coal resources. This amount represents about 3 percent of the known coal reserves in the Kaiparowits Plateau coal field.
	LAND USES	
Agriculture: The plant would occupy 2,000 acres of low productivity rangeland.	Agriculture: The plant would occupy 1,500 acres of moderately productive rangeland and 500 acres of irrigated farm land.	Agriculture: The plant would occupy 1,000 acres of moderately productive rangeland and 1,000 acres of dry farm land.

TABLE 8-3 (continued)

Alternative Sites		
Delta	Soda Springs	Proposed Site
SCENIC RESOURCES		
The contrast of the site from adjacent highways would be medium. The view from Little Sahara Recreation Area would be degraded. The coal supply railroad would produce the same impacts as described for the Nephi site. The contrast of the new transmission line highway crossing would be high. Contrast of additional lines would be low.	The contrast of the power plant would be high when viewed from adjacent highways. The plant would degrade the view from a BLM roadless area. The addition of transmission lines at Oneida Narrows would somewhat degrade the aesthetic appeal of the area, but would not add appreciably to the present man-made contrast at the site. At highway crossings, the contrast of the new transmission lines would be high. Lines constructed parallel to existing transmission lines would create only a small amount of additional contrast.	The units would make the plant site more obvious to travelers on Highway U-10, from areas of Class A scenery on the San Rafael Swell and the Wasatch Plateau, and a rest area on I-70. The coal conveyor would establish high contrast in Cottonwood Canyon. The aesthetics of the area would be degraded for recreationists using Cottonwood Canyon or I-29 for access to the Joes Valley area. The proposed transmission line would parallel an existing line and would generally create only a low increase in man-made contrast. An additional 345-kV line at highway crossings would result in a low to medium increase of contrast and the presence of transmission lines would be more obvious to travelers. The addition of power lines at the mouth of Spanish Fork Canyon would not add appreciably to the present man-made contrast. Any atmospheric discoloration or any reduction in visual range would degrade the scenic quality in areas of scenic interest. Predicted visual range reduction at these areas would be less than the 10 to 20 percent variability that presently occurs and might not be noticeable (Cramer, 1978). Atmospheric discoloration calculations showed there would be no cases of discoloration at any areas of special interest (Cramer, 1978).
MINERALS		
Same as for Nephi site.	The removal of 114 million tons of coal from the Eastern Powder River Coal Basin represents about 1 percent of the total recoverable reserves.	Seventy million tons of coal would be mined for Units 3 and 4. Estimated coal remaining in the mine lost to recovery would be 47 million tons. This is a total loss of 118 million tons of nonrenewable coal reserves. This amount represents less than 2 percent of the known coal reserves in the Wasatch Plateau coal field.
LAND USES		
Agriculture: The plant would occupy 2,000 acres of low production rangeland.	Agriculture: The plant would occupy 2,000 acres of highly productive dry farmland.	Agriculture: The loss of 14,000 acre-feet of irrigation water annually could result in the loss of up to 3,415 acres of irrigated land. This change could impair ability of ranch property to support livestock and would reduce the ranchers ability to meet grazing permit requirements for the federal ranges.

TABLE 8-3 (continued)

	Alternative Sites	
Green River	Wellington	Nephi
	LAND USES (continued)	
Recreation: The increase in population would mean additional visitor days spent fishing and hunting both big and upland game species. This would decrease the quality of the recreation experience. The developed recreation sites in the area would experience the same impacts as those described for the proposed action.	Recreation: The increase in population would mean additional visitor days spent fishing and hunting both big and upland game species. This would decrease the quality of the recreation experience. The developed recreation sites in the area would experience the same impacts as described for the proposed action.	Recreation: The increase in population would mean additional visitor days spent fishing and hunting both big and upland game species. This would decrease the quality of the recreation experience. The developed recreation sites in the area would experience the same impacts as described for the proposed action. The coal haul railroad would pass by three developed recreation areas. These recreation areas are Otter Creek, Piute Reservoir, and Yuba Dam. As a result it would reduce the value of these areas for recreation use. Local fisheries would require additional stocking to maintain present fish levels or the quality of the fishing experience would decrease. Clear Lake, a waterfowl area, would experience increased hunting pressure which would reduce the quality of the hunting experience.
Special Designation Areas: Because no disturbance or construction would be allowed in BLM Roadless Inventory Units prior to completion of the wilderness review, no impacts can be identified. In the influence zone, the same types of impacts would occur as described for the proposal.	Special Designation Areas: In the influence zone, the same types of impacts would occur as described for the proposal.	Special Designation Areas: Because no disturbance or construction would be allowed in BLM Roadless Inventory Units prior to completion of the wilderness review, no impact can be identified. In the influence zone, the same types of impacts would occur as described for the proposal.
Transportation System: Increased traffic would result in local highway congestion and accelerated road damage.	Transportation system: Increased traffic would result in local highway congestion and accelerated road damage.	Transportation System: Increase traffic would result in local highway congestion and accelerated road damage.
Other Land Uses: The generating complex would be less than one mile from the unfinished Green River Airport. If the plant were located at this site, a new location for the airport would be required. Land use impacts of the coal source and common transmission line corridor would be the same as for the proposal.	Other Land Uses: Land Use impact of the coal source and common transmission line corridor would be the same as for the proposal.	Other Land Uses: No issue identified.

TABLE 8-3 (continued)

Alternative Sites		
Delta	Soda Springs	Proposed Site
	LAND USES (continued)	
Recreation: Would be the same as described for the Nephi site.	Recreation: The increase in population would mean additional visitor days spent fishing and hunting both big and upland game species. This would decrease the quality of the recreation experience. The developed recreation sites in the area would experience the same impacts as described for the proposed action.	Recreation: The influx of people into the area would affect urban and non-urban recreational sites. Overcrowding of recreational facilities could cause deterioration of physical improvements and environments. Existing recreational facilities operated by federal, state, and local governmental agencies would be most affected. Additional pressure would cause greater deterioration of those sites presently being over used (greater than 40 percent of capacity) and some site degradation to those receiving use over 20 percent of capacity (see Table 2-6). The increase in population would mean an additional visitor days spent fishing and hunting both big and upland game species. This would decrease the quality of the recreation experience.
Special Designation Areas: Because no disturbance or construction would be allowed in BLM Roadless Inventory Units prior to completion of the wilderness review, no impact can be identified. In the influence zone, the same types of impacts would occur as described for the proposal.	Special Designation Areas: In the influence zone, the same types of impact would occur as described for the proposal.	Special Designation Areas: In the influence zone, areas identified with potential for special designation may receive additional ORV and other visitor use, resulting in degradation of values for which the areas are being protected and studied.
Transportation System: Increased traffic would result in local highway congestion and accelerated road damage.	Transportation System: Increased traffic would result in local highway congestion and accelerated road damage.	Transportation Systems: Increased traffic would result in local highway congestion, and accelerated road damage.
Other Land Uses: No issue identified.	Other Land Uses: No issue identified.	Other Land Uses: No issue identified.

TABLE 8-3 (continued)

	Alternative Sites	
Green River	Wellington	Nephi
	HUMAN RESOURCES	
Employment Green River: Employment is expected to peak at about 1,130 in 1982 and drop to approximately 350 by 1987. Grand County: Estimated peak at about 220 jobs in 1982, leveling off to about 80 in 1987. Price River Valley and Castle Valley: Because these areas are involved with the coal supply, peak and permanent populations would be the same and are estimated at 1,730 jobs in 1987.	Employment Approximately 2,160 permanent jobs would be added to the two county area in 1987 as a result of the project, down from a peak of approximately 2,280 jobs in 1985.	Employment Juab County: Peak employment of approximately 1,530 in 1982 would drop to approximately 440 permanent jobs in the area in 1987. Garfield County: Approximately 1,680 additional jobs would be added to the Garfield County economy by 1987.
Population Green River: Green River would experience a "Boom and Bust" cycle in population with 680 people in 1987, down from 2,460 in 1982. Moab: "Boom and Bust" cycle stabilizing at 100 people in 1987, down from 360 in 1982. Price River Valley and Castle Valley: These areas would be impacted by coal mining population, therefore, their peak and permanent figures would be the same. Price River Valley would stabilize at approximately 780 people in 1987, with Castle Valley stabilizing at approximately 3,820 people in 1987.	Population Price River Valley: Reduction in number of people from 3,110 at the peak in 1982 to a stable population of 1,970 in 1987, "Boom and Bust." Castle Valley: Peak and permanent population would both occur in 1987 with 2,940 residents added to the area.	Population Juab County: Peak population would occur in 1982 with approximately 3,340 people which would then decline to 1,010 by 1987. Garfield County: Approximately 2,860 additional people would be added to Garfield County by 1987.
Income The project would increase total earnings in the impacted areas by a peak of 37.9 million dollars in 1982 and stabilizing at approximately 24.9 million dollars. Personal income would be increased at the peak by 44.4 million dollars and would stabilize at approximately 28.3 million dollars.	Income Earnings: Peak earnings for the area would occur in 1982 with approximately 38.3 million dollars being added to the local economy. This would decrease and stabilize at approximately 24.7 million dollars in 1987. Personal Income: This would increase to 44.8 million dollars at the peak in 1982 and would then stabilize at 28.1 million dollars in 1987.	Income Earnings: Project related earnings would peak at approximately 41.7 million dollars in 1982 and would then decline to approximately 26.6 million dollars annually in 1987. Total personal income related to the project would peak at approximately 47.5 million dollars in 1982 thereafter declining to approximately 3.3 million dollars per year in 1987.
Housing Green River: A peak of approximately 790 housing units would be required, dropping off to a stable requirement of approximately 260 units. Moab: Peak housing units required would be 150, stabilizing at approximately 60 permanent units. Price River Valley: Peak requirement of approximately 280 housing units, permanent requirement for 250 units. Castle Valley: 1,010 units would be needed.	Housing Price River Valley: Peak requirement of 990 units, dropping to a permanent requirement for 630 units. Castle Valley: Peak and permanent need for 940 units.	Housing Juab County: Peak need for approximately 1,070 units stabilizing at approximately 300 units. Garfield County: Need for approximately 1,240 housing units.
Education Moab: Approximately 90 students would be added to the rolls during the peak population requiring three additional teachers. Approximately 20 additional students woulr require one teacher during the operational phase. Carbon County: Two hundred ten additional students would require eight teachers during peak construction. Approximately 185 additional students would require seven teachers during operational phase. Emery County: Approximately 915 additional pupils would require 37 additional teachers.	Education Price River Valley: A peak of 740 additional students would require 30 additional teachers. Permanent addition of approximately 470 students would require 19 teachers. Castle Valley: Peak and permanent addition of approximately 700 additional students requiring 28 additional teachers.	Education Juab County: Approximately 800 students requiring 33 teachers would be added to the school system during the peak employment. This would then stabilize at approximately 240 students, requiring ten additional teachers. Garfield County: Approximately 920 additional students requiring 37 additional teachers would be added to the local school system.

TABLE 8-3 (continued)

Alternative Sites		
Delta	Soda Springs	Proposed Site
	HUMAN RESOURCES	
Employment Millard County: Employment would drop from a peak of approximately 1,552 jobs in 1982 to a stable level of approximately 400 new jobs in 1987. Garfield County: See "Garfield" under Nephi alternative.	Employment Project related employment would peak in 1982 at approximately 1,720 jobs and then stabilize at approximately 370 permanent jobs in 1987.	Employment Peak employment of 1,680 jobs would occur in 1985 and would stabilize at 1,610 jobs in 1990.
Population Millard County: Peak population would be approximately 3,380 in 1982 and would then decline to approximately 970 at the stable phase in 1987.	Population Caribou County would experience a peak population influx of approximately 3,750 persons in 1982. This would then decrease and stabilize at approximately 850 additional project related persons in 1987.	Population The total peak population of 3,840 in 1985 and the permanent force at 3,640 in 1987 would reside in Carbon and Emery counties. Without the project, the population would increase at the same rate because of coal development.
Income Earnings: Earnings due to the project would peak at approximately 41.7 million dollars in 1982, thereafter declining to approximately 26.6 million dollars annually in 1987. Total personal income: Peak would be approximately 47.5 million dollars in 1982, declining to a stable level of approximately 30.3 million dollars per year in 1987.	Income Earnings: Peak project related earnings would be approximately 40.8 million dollars in 1982 with stable annual project related income at approximately 11.2 million dollars in 1987. Total personal income: Peak personal income would be approximately 46.5 million dollars in 1982, stabilizing at approximately 12.8 million dollars annually in 1987.	Income Earnings: Peak project related earnings would be approximately 46.7 million dollars in 1982, with stable annual project related income at approximately 30.6 million dollars in 1987. Total personal income: Peak personal income would be approximately 28.6 million dollars in 1982, stabilizing at approximately 20.8 million dollars annually in 1987.
Housing Millard County: Peak of approximately 1,080 units would then decline to approximately 310 required units at the permanent level.	Housing Caribou County would need approximately 1,200 housing units at the peak and approximately 270 units being required for the permanent population.	Housing The greatest impact on housing would occur in 1985 when 1,190 units would be needed. About 29 percent of the population would live in Price and Helper and 71 percent would live in Huntington, Castle Dale, Ferron, and Orangeville. The remaining workers would be expected to find housing in the more rural areas of Castle Valley.
Education Millard County: A peak of approximately 810 students would be added to the school system requiring an additional 32 teachers. Two hundred and thirty permanent students would be added requiring nine additional teachers.	Education Approximately 900 students would be added to the Caribou County schools at peak employment, requiring 35 additional teachers. This would then stabilize at approximately 200 students requiring approximately 8 teachers.	Education The increased student population would require 36 permanent, additional teachers.

TABLE 8-3 (concluded)

Alternative Sites		
Green River	Wellington	Nephi
	HUMAN RESOURCES (continued)	
Culinary Water Green River: The project would require that the water system be updated approximately 2 years sooner than would be required without the project. Moab: No impact due to the project. Price River Valley: No impact due to the project. Castle Valley: No impact due to the project.	Culinary Water Price River Valley: Require additional water capacity approximately 1 year sooner than would be needed without the project. Castle Valley: Additional capacity required approximately 2 years sooner than would be required without the project.	Culinary Water Juab County: No project related impacts. Garfield County: No project relateo impacts.
Sewer Green River: Additional sewer capacity would be required at least 7 years sooner than without the project. Moab: No impact due to project. Price River Valley: No impact due to project. Castle Valley: No impact due to project.	Sewer Price River Valley: Additional capacity required approximately 2 years sooner than without the project. Castle Valley: No project related impact.	Sewer Juab County: No project related impacts. Garfield County: No project related impacts.
Medical One physician and one dentist would be needed at Green River.	Medical Two additional physicians and two additional dentists would be needed in the project area.	Medical Juab County: Three physicians, one dentist would be required, due to the project. Garfield County: Approximately three physicians and one dentist would be needed in the Garfield area due to the project.

TABLE 8-3 (concluded)

Alternative Sites Delta	Soda Springs	Proposed Site
	HUMAN RESOURCES (continued)	
Culinary Water Millard County: No project related impact.	Culinary Water No project related impact.	Culinary Water The present water system is not adequate for the population increase.
Sewer Millard County: No project related impact.	Sewer Possibility of exceeding capacity during peak population, then population would stabilize within capacity of the existing system.	Sewer The present sewage system is not adequate for the population increase.
Medical Millard County: At least two physicians and one dentist would be required as a result of the project.	Medical At least one additional physician and one additional dentist would be required in Caribou County due to the project.	Medical Two additional physicians and two additional dentists would be needed.

Mitigating Measures Unique to Alternative Sites

Mitigation Required of the Applicant by Federal Agencies

Coal Haul Railroad for Nephi and Delta Alternatives

During critical periods, November 1 to April 30, cease railroad construction, on federal lands, in critical deer wintering areas (Mileposts 12-22, 37-43, 55-56, 59-60, 80-85, and 86-87).

Soda Springs Site--Transmission Line

Cease transmission line construction from November 1 to April 30 in critical deer wintering areas in Oneida Canyon.

Green River Transmission Line (Green River to Huntington Substation)

Construct structures of wood; allow no new bladed roads.

Measures Required of the Applicant by State and Local Entities

The same mitigating measures on state and local government lands could be required as on federal land. Authority is granted to the State of Utah under the Utah Code Annotated (UCA) 1953, 65-2-1.

Effectiveness of Mitigating Measures

Deer are sensitive to harassment during the later months of the winter season. During January through April, deer are in a weakened condition and disturbance can cause death. Mitigation would save an unknown number of deer on federal land along the coal haul railroad. Sage grouse, if disturbed during the strutting period, would not mate and reproduction would be lost for that year (DWR, 1978).

Unavoidable Adverse Impacts

Table 8-4 summaries the unavoidable adverse impacts of the alternative sites and the proposal.

TABLE 8-4

Unavoidable Adverse Impacts

	Alternative Sites	
Green River	Wellington	Nephi
	AIR QUALITY	
The emission of 14.5 tons of SO_2, 81.0 tons of NO_2, and 5.3 tons of particulates per day would cause unavoidable air quality degradation. Some impairment to visibility from visual range degradation and atmospheric discoloration might occur at the existing Class I areas of Arches and Canyonlands National Parks.	The emission of 14.5 tons of SO_2, 81.0 tons of NO_2, and 5.3 tons of particulates per day would cause unavoidable air quality degradation. Some visibility impairment would also occur.	The emission of 17.6 tons of SO_2, 82.0 tons of NO_2, and 4.5 tons of particulates per day would cause unavoidable air quality degradation. Some visibility impairment would also occur. Because of nearby elevated terrain, it is likely that the plant could not meet PSD regulations.
	GEOLOGY AND TOPOGRAPHY	
Same as for the proposal.	Same as for the proposal.	The mining of coal for the power plant could result in subsidence on 4,000 to 5,000 acres. Maximum subsidence expected to occur would be from 1 to 5 feet. If subsidence caused severe fracturing of the strata, aguifers could be damaged in their water-transporting ability.
	VEGETATION	
Six possibly threatened or possibly endangered plant species could be reduced in numbers or have essential habitat damaged. Essential habitat for possibly threatened and possibly endangered flora within the influence zone could be damaged by increased recreational use (e.g., ORV). Some plants could be destroyed, and some species (such as cactus) might be taken by collectors. Impact magnitude cannot be assessed, but is expected to be slight. It is not expected than any species would become extinct. However, some species could be destroyed locally. Impacts to riparian vegetation would be the same as for the proposal.	Four possibly endangered plant species along the pipeline route in the Cat Canyon area could be reduced in number or have their essential habitat damaged. Essential habitat for possibly threatened and possibly endangered flora within the influence zone could be damaged by increased recreational use (e.g., ORV). Some plants could be destroyed and some species (such as cactus) might be taken by collectors. Impact magnitude cannot be assessed, but is expected to be slight. It is not expected than any species would become extinct. However, some species could be destroyed locally. Impacts to riparian vegetation would be the same as for the proposal.	Twenty-three species of possibly threatened or possibly endangered plants could be reduced in numbers or some of their essential habitat could be destroyed by construction of the railroad and transmission line. Essential habitat for possibly threatened and possibly endangered species and one officially threatened species within the plant site and coal mine influence zones could be damaged by increased recreational use (e.g., ORV). Some plants could be destroyed, and some species (such as cactus) might be taken by collectors. Impact magnitude cannot be assessed, but is expected to be slight. It is not expected that any species would become extinct. However, some species could be destroyed locally.
	WATER RESOURCES	
Results of subsidence would be the same as for the proposal.	Results of subsidence would be the same as for the proposal.	Subsidence following mining operations could intercept ground water aquifers above the mined areas in Alvey Wash. Oak and Rock springs could be affected with the possible reduction of a unknown amount of surface discharge.

TABLE 8-4

Unavoidable Adverse Impacts

Alternative Sites		
Oelta	Soda Springs	Proposed Site
	AIR QUALITY	
The emission of 17.6 tons of SO_2, 82.0 tons of NO_2, and 4.5 tons of particulates per day would cause unavoidable air quality degradation. Some visibility impairment would also occur.	Emission of SO_2 and particulates could add to the high existing concentrations of these pollutants in the Soda Springs-Conda area.	Using worst-grade coal, the plant would emit 12.5 tons of SO_2, 70 tons of NO_2, and 4.6 tons of particulates per day. Although emission rates and resulting concentrations would meet the NSPS, NAAQS, and PSO regulations, the discharge of pollutants into the atmosphere would cause a degradation of air quality. Some visibility impairment would also occur.
	GEOLOGY AND TOPOGRAPHY	
Same as for Nephi.	Mining would occur at an existing strip mine in the Gillette, Wyoming coal field.	Subsidence, up to a maximum of 10 feet, could occur above the mine area.
	VEGETATION	
Same as for Nephi.	Essential habitat for possibly threatened and possibly endangered flora within the influence zone could be destroyed and some species (such as cactus) might be taken by collectors. Impact magnitude cannot be assessed, but is expected to be slight. It is not expected than any species would become extinct. However, some species could become expirpated locally.	One species of possibly endangered plant could be reduced in numbers or some of its essential habitat could be destroyed by transmission line construction. Essential habitat for possibly threatened and possibly endangered flora within the influence zone could be damaged. Some plants could be destroyed and some species (such as cactus) might be taken by collectors. Impact magnitude cannot be assessed, but is expected to be slight. It is not expected that any species would become extinct. However, some species could be destroyed locally. About 1,400 linear feet (about 2/3 acre) of riparian vegetation would be lost along Cottonwood Creek.
	WATER RESOURCES	
Same as for Nephi.	No issue identified.	Use of water at the plant would change the use of 14,000 acre-feet of water per year from agricultural to industrial. Subsidence following mining operations could intercept ground water aquifers above the mined area. Springs and other surface waters could be affected. The magnitude of this impact cannot be determined.

TABLE 8-4 (continued)

	Alternative Sites	
Green River	Wellington	Nephi
	ANIMAL LIFE	
Plant Site: No issue identified.	Plant Site: Agricultural lands which support pheasants would be cleared.	Plant Site: 2,000 acres utilized by mourning dove and sage grouse could be cleared. Reduced populations of each could result.
Coal Supply: Same as for the proposal.	Coal Supply: Same as for the proposal.	Coal Supply: Construction of the coal transport railroad from the Garfield coal fields could: (1) cause destruction and deterioration of trout habitat in the East Fork of the Sevier River from Mileposts 50 to 78. Trout numbers and reproduction would be diminished. (2) result in losses to wintering deer if construction proceeded on private lands between mileposts 56-59, 78-80, and 85-86 from November 1 to April 30. (3) result in the loss of three sage grouse strutting grounds near Widtsoe. Construction activities and train disturbance could cause these areas to be abandoned and grouse production reduced. (4) cause disturbance and destruction of waterfowl nesting, moulting, and breeding habitat along the East Fork of the Sevier River and the Sevier River between Mileposts 55-85 and 155-170. (5) result in harassment and disturbance by construction crews to bald and golden eagles in John's Valley. (6) result in losses to the endangered Utah prairie dog if railroad construction proceeded across prairie dog colonies in John's Valley Train travel and periodic railway maintenance would subject deer, waterfowl, and other wildlife to continual disturbance in areas not presently subjected to disturbance. In addition, trains could collide with deer, especially in wintering areas. As a result of subsidence, the surface discharge of both Rock and Oak Springs could be reduced or eliminated. This would cause loss of deer, small mammals, etc., from an area of otherwise suitable habitat. The number of individuals or wildlife species affected is not known.
Water Supply: The endangered Colorado River squawfish and humpback chub, the proposed endangered bonytail chub, and the proposed threatened razorback sucker inhabit the portion of the Green River where water would be removed for plant operation. Effects of a maximum decrease of 5 percent in Green River flow below the water takeout on these species cannot be assessed.	Water Supply: Same as for Green River.	Water Supply: No issued identified.

TABLE 8-4 (continued)

Alternative Sites		
Delta	Soda Springs	Proposed Site
	ANIMAL LIFE	
Plant Site: No issue identified.	Plant Site: 2,000 acres of Hungarian partridge habitat could be lost. Effect on Hungarian partridge is unknown.	Plant Site: No issue identified.
Coal Supply: Same as for Nephi.	Coal Supply: No issue identified.	Coal Supply: Construction of the conveyor and surface facilities in Cottonwood Canyon would disrupt deer migration routes and disturb deer wintering areas resulting in an undetermined loss of deer. Coal transport and other mining traffic on Utah Highway 29 would cross essential deer winter range for approximately 6 miles. Road kills on U-29 would be expected to increase as a result of increased traffic.
Water Supply: No issue identified.	Water Supply: The proposed Caribou Reservoir would inundate 12 miles of river bottom habitat utilized as nesting areas by approximately 35 pairs of Canada geese, three pairs of sandhill cranes, and several duck species. This nesting habitat would be lost resulting in lost waterfowl production in the area. Impoundment of the river would reduce feeding areas for bald eagles after the reservoir freezes.	Water Supply: Change in water use from agricultural to industrial could retire as much as 3,415 acres of farmland which would result in a loss of approximately 900 breeding pheasants and their annual production of 1,800 young.

TABLE 8-4 (continued)

	Alternative Sites	
Green River	Wellington	Nephi
	ANIMAL LIFE (continued)	
Transmission Line: Same as proposal with the addition of possible disturbance to black-footed ferrets in Buckhorn Flat. Sighting of black-footed ferrets are too infrequent to determine the impact.	Transmission Line: Same as for the proposal.	Transmission Line: Transmission line construction in Cedar Valley could adversely affect wintering bald eagles. Transmission line construction in Sage and Dog Valley could result in lost production of sage grouse if it proceeded in the vicinity of strutting and nesting areas between March 15 and May 1. Locations of these areas are unknown. Transmission structures placed in the vicinity of sage grouse strutting grounds would create perches for raptors which would prey on strutting grouse with greater proficiency. Abandonment of these strutting grounds could result.
Work Force: Similar to the proposal.	Work Force: Same as for the proposal.	Work Force: Same as for the proposal.
	CULTURAL AND PALEONTOLOGICAL RESOURCES	
On-Site Damage: Potential damage to one known site.	On-Site Damage: The six sites known to exist in the proposed transmission line corridor and the one site located on the plant complex could be damaged. There is a possibility of destroying highly important paleontological remains in the Morrison Formation during pipeline construction.	On-Site Damage: There is a potential of damaging two sites at the generating complex, 23 sites along the railroad line, and two sites along the transmission line corridor.
Illegal Use: Increased vandalism to both cultural and paleontological values would result from the increased population and new access brought about by the proposed actions. Many archaeological sites are known to exist in the influence zone. Illegal collecting of artifacts would mean a loss in the scientific understanding of ancient cultural activities in the area. Similar impacts would occur to paleontological resources. The impact significance is unknown.	Illegal Use: Increased vandalism to both cultural and paleontological values would result from the increased population and new access brought about by the proposed actions. Many archaeological sites are known to exist in the influence zone. Illegal collecting of artifacts would mean a loss in the scientific understanding of ancient cultural activities in the area. Similar impacts would occur to paleontological resources. The impact significance is unknown.	Illegal Use: Increased vandalism to both cultural and paleontological values would result from the increased population and new access brought about by the proposed actions. Many archaeological sites are known to exist in the influence zone. Illegal collecting of artifacts would mean a loss in the scientific understanding of ancient cultural activities in the area. Similar impacts would occur to paleontological resources. The impact significance is unknown.

TABLE 8-4 (continued)

Alternative Sites		
Delta	Soda Springs	Proposed Site
ANIMAL LIFE (continued)		
Transmission Line: No issue identified.	Transmission Line: No issue identified.	Transmission Line: Disturbance of deer and elk winter range would occur on private land along the transmission line, resulting in a loss of deer and elk. Construction during the fawning and calving periods (May 15-July 15) would contribute to loss of deer fawns and elk calves. If construction were to take place during the sage grouse strutting period (March 15 to May 30), decrease in sage grouse reproduction would occur. If construction took place between November 1 and July 15, moose wintering and calving would be adversly affected. The magnitude of these impacts cannot be determined. The transmission line would pass through bald eagle wintering areas in the Huntington to Gordon Creek area and Spanish Fork Canyon. Harassment by construction crews, on private land, could be detrimental.
Work Force: Same as for the proposal.	Work Force: Similar to the proposal, but in the Soda Springs area. It is not expected that the endangered whooping crane would be affected.	Work force: Increased human populations would result in losses to all wildlife due to displacement, inadvertant and intentional kills, and harassment. Increased hunting and fishing pressure due to the larger human population would most adversely affect game animals in the secondary influence zone.
CULTURAL AND PALEONTOLOGICAL RESOURCES		
Same as for Nephi, except no archaeological values have been found at the plant site.	The plant complex would detract from the character of the Oregon Trail. Increased vandalism to both cultural and paleontological values would result from the increased population and new access brought about by the proposed actions. Many archaeological sites are known to exist in the influence zone. Illegal collecting of artifacts would mean a loss in the scientific understanding of ancient cultural activities in the area. Similar impacts would occur to paleontological resources. The impact significance is unknown.	Additional people in the secondary influence zone would result in partial destruction or total loss of valuable scientific information. Ground disturbance during construction would cause damage to subsurface values not initially discovered through field inventories. Even if salvage were performed, an unknown amount of scientific evidence would be lost.

TABLE 8-4 (continued)

Alternative Sites Green River	Wellington	Nephi
	SCENIC RESOURCES	
Coal source impacts would be the same as those for the proposed action. The plant site would degrade the view from the Spotted Wolf Point Overlook, from I-70, from the San Rafael Reef, and Oesolation Canyon areas. The intake for the water system would degrade the pristine character of the lower Green River. The presence of an additional transmission line would degrade the view from Cedar Mountain and in the Buckhorn Flat area. An additional transmission line at highway crossings would create little additional contrast. The contrast of the site would be high from adjacent highways. The addition of a transmission line at the mouth of Spanish Fork Canyon would slightly degrade the aesthetics. Any atmospheric discoloration or reduction in visual range would degrade the scenic quality at areas of special scenic interest. The extent of impact is not known.	Coal source impacts would be the same as those for the proposed action. The intake for the water system has the same impact as the Green River Alternative. A new line crossing U-10 would create high contrast. The contrast of the site would be high from adjacent highways. The addition of a transmission line at the mouth of Spanish Fork Canyon would slightly degrade the aesthetics. Any atmospheric discoloration or reduction in visual range would degrade the scenic quality at areas of special scenic interest. The extent of impact is not known.	The presence of the railroad would create high to moderate man-made contrast and would degrade the aesthetic appeal of sensitive areas. This is particularly true of the remote Kaiparowits Plateau area. The railroad crossing at U.S. 89 and I-15 would create high contrast. The man-made contrast of new transmission line highway crossings would be high. Additional man-made contrast would be lower where new lines were added to existing lines.
	MINERALS	
Eighty-two million tons would be mined and used in power generation. Estimated coal remaining in the mine lost to recovery would be 56 million tons. This is a total loss of 138 million tons of nonrenewable coal reserves. This amount represents about 2 percent of the known coal reserves in the Wasatch Plateau coal field.	Same as for Green River site.	Ninety-two million tons of coal would be mined and used in power generation. Estimated coal remaining in the mine lost to ultimate recovery would be 61 million tons. This is a total loss of 153 million tons of nonrenewable coal resources. This amount represents about 3 percent of the known coal reserves in the Kaiparowits Plateau coal field.
	LAND USES	
Agriculture: The plant would occupy 2,000 acres of low productivity rangeland.	Agriculture: The plant would occupy 1,500 acres of moderately productive rangeland and 500 acres of irrigated farmland.	Agriculture: The plant would occupy 1,000 acres of moderately productive rangeland and 1,000 acres of dry farm land.
Recreation: Increased pressure would cause greater deterioration of those sites presently being overused (greater than 40 percent of capacity). In addition, sanitary and garbage problems are expected. Additional competition for available fish and game would lead to reduced hunter and fisherman success, resulting in dissatisfaction with the recreational experience.	Recreation: Increased pressure would cause greater deterioration of those sites presently being over used (greater than 40 percent of capacity). In addition, sanitary and garbage problems are expected. Additional competition for available fish and game would lead to reduced hunter and fisherman success, resulting in dissatisfaction with the recreational experience. Local fisheries would require additional stocking to maintain present fish levels or the quality of the fishing experience would decrease.	Recreation: The coal haul railroad would pass by three developed recreation areas. These recreation areas are Otter Creek, Piute Reservoir, and Yuba Dam. As a result it would reduce the value of these areas for recreation use. Increased pressure would cause greater deterioration of those sites presently being over used (greater than 40 percent of capacity). In addition, sanitary and garbage problems are expected. Additional competition for available fish and game would lead to reduced hunter and fisherman success, resulting in dissatisfaction with the recreational experience. In addition, Clear Lake, a waterfowl area, would experience increased hunting pressure which would reduce the quality of the hunting experience.

TABLE 8-4 (continued)

Alternative Sites		
Delta	Soda Springs	Proposed Site
	SCENIC RESOURCES	
Railroad--Same as Nephi. The contrast where the line crosses highways for the first time would be high. Additional contrast at highways crossings where line presently exist would be low. The contrast of the site from adjacent highways would be medium.	The addition of transmission lines at Oneida Narrows would somewhat degrade the aesthetic appeal of the area, but would not add appreciably to the present man-made contrast at the site. The contrast of the new highway transmission line crossing would be high. Additional contrast at the highway crossing where lines already exist would be low. The contrast of the power plant would be high from adjacent highways. The plant would degrade the view from the BLM Petticoat Peaks Roadless Area.	The plant would become more obvious to travelers on Highway U-10, and viewers from areas of Class A scenery--the San Rafael Swell, the Wasatch Pateau, and a rest area on I-70. The coal conveyor and loading site would degrade the aesthetics of Cottonwood Canyon and Highway U-29. An added transmission line at highways crossings would be more obvious to travelers and would degrade the aesthetics at the mouth of Spanish Fork Canyon. Any atmospheric discoloration or any reduction in visual range would degrade the scenic quality in areas of scenic interest. Predicted visual range reductions at these areas would be less than the 10 to 20 percent variability that presently occurs, and might not be noticeable (Cramer, 1978). Atmospheric discoloration calculations showed there would be no cases of discoloration at any area of scenic interest (Cramer, 1978).
	MINERALS	
Same as for Nephi.	The removal of 114 million tons of coal from the Eastern Powder River Coal Basin represents about 1 percent of the total recoverable reserves.	A maximum of 70 million tons of coal would be removed, leaving behind an estimated unrecoverable 47 million tons. A total of 117 million tons of non-renewable coal reserve would be lost. The loss would represent about 15 percent of the known coal reserve in the East Mountain area, but less than 2 percent of the known coal reserves in the Wasatch Plateau coal field.
	LAND USES	
Agriculture: The plant would occupy 2,000 acres of low productive rangeland.	Agriculture: The plant would occupy 2,000 acres of highly productive farm land.	Agriculture: Water use would be changed from agricultural to industrial, retiring a maximum of 3,415 acres of farmland. This change could impair ability of ranch property to support livestock--reducing ranchers ability to meet grazing permit requirements for the federal ranges.
Recreation: Would be the same as described for the Nephi site.	Recreation: Increased pressure would cause greater deterioration of those sites presently being overused (greater than 40 percent of capacity). In addition, sanitary and garbage problems are expected. Additional competition for available fish and game would lead to reduced hunter and fisherman success, resulting in dissatisfaction with the recreational experience.	Recreation: The influx of people into the area would affect urban and non-urban recreational lands sites. Overcrowding of recreational facilities could cause deterioration of physical improvements and environments. Existing recreational facilities operated by federal, state, and local governmental agencies would be most affected. Increased pressure would cause greater deterioration of those sites presently being over used (greater than 40 percent of capacity). In addition, sanitary and garbage problems are expected. The increase in population would mean additional visitor days spent fishing and would result in an increased demand for fish. This could require increased trout stocking to maintain present fisherman success. Additional hunters would be afield in pursuit of big and upland game. ORV use by people associated with the proposed project would increase creating additional pressure on suitable lands.

TABLE 8-4 (continued)

	Alternative Sites	
Green River	Wellington	Nephi
	LAND USES (continued)	
Wilderness: Same as proposal.	Wilderness: Same as the proposal.	Wilderness: Same as the proposal.
Transportation System: Increased traffic would result in local highway congestion and accelerated land damage.	Transportation System: Increase traffic would cause local highway congestion and accelerated land damage.	Transportation System: Increased traffic would cause local highway congestion and accelerated road damage.
Other Land Uses: The generating complex would be less than 1 mile from the unfinished Green River Airport. If the plant was located at this site, a new location for the airport would be required.	Other Land Uses: No issue identified.	Other Land Uses: No issue identified.
	HUMAN RESOURCES	
Total Increased Employment Peak 2,280 Permanent 2,160	Total Increased Employment Peak 2,280 (1985) Permanent 2,160 (1987)	Total Increased Employment Juab County Peak 1,530 (1982) Permanent 440 (1987) Garfield County Peak 1,680 (1987) Permanent 1,680 (1987)
Increased population: Green River Peak 2,460 in 1982 Permanent 680 in 1987 Moab Peak 360 in 1982 Permanent 100 in 1987 Price River Valley Peak 3,820 in 1987 Permanent 3,820 in 1987 Castle Valley Peak 870 in 1985 Permanent 780 in 1987	Increased Population: Price River Valley Peak 3,110 (1982) Permanent 1,970 (1987) Castle Valley Peak 2,940 (1987) Permanent 2,940 (1987)	Increased Population Juab County Peak 3,340 (1982) Permanent 1,010 (1987) Garfield County Peak 3,860 (1987) Permanent 3,860 (1987)
Increased Income (1975 dollars) Earnings Peak $37.9 million in 1982 Permanent $24.9 million in 1987 Personal Income Peak $44.4 million in 1982 Permanent $28.3 million in 1987	Increased Income (1975 dollars) Earnings Peak $38.3 million in 1982 Permanent $24.7 million in 1987 Personal Income Peak $44.8 million in 1982 Permanent $28.1 million in 1987	Increased Income (1975 Dollars) Earnings Peak $41.7 million in 1982 Permanent $26.6 million in 1987 Personal Income Peak $47.5 million in 1982 Permanent $30.3 million in 1987
Housing Needs Green River Peak 790 Permanent 260 Moab Peak 150 Permanent 60 Price River Valley Peak 280 Permanent 250 Castle Valley Peak 1,010 Permanent 1,010	Housing Needs Price River Valley Peak 990 Permanent 610 Castle Valley Peak 940 Permanent 940	Housing Needs Juab County Peak 1,070 Permanent 320 Garfield County Peak 1,240 Permanent 1,240

TABLE 8-4 (continued)

Alternative Sites		
Delta	Soda Springs	Proposed Site
	LAND USES (continued)	
Wilderness: Same as the proposal.	Wilderness: Same as the proposal.	Wilderness: In the secondary influence zone, RARE II areas and possible BLM roadless areas, including those identified by management planning as having potential for wilderness study, may receive additional ORV and other visitor use, resulting in degradation of possible wilderness values.
Transportation System: Increased traffic would result in local highway congestion and accelerated road damage.	Transportation System: Increased traffic would result in local highway congestion and accelerated road damage.	Transportation System: Increased traffic would result in local highway congestion, and accelerated road damage, and impairment of local livestock trailing.
Other Land Uses: No issue identified.	Other Land Uses: No issue identified.	Other Land Uses: No issue identified.
	HUMAN RESOURCES	
Total Increased Employment Millard County Peak 1,552 (1982) Millard County Permanent 420 (1987)	Total Increased Employment Caribou County Peak 1,720 (1982) Caribou County Permanent 370 (1987)	Total Increased Employment Peak 1,680 (1985) Permanent 1,610 (1990)
Increased Population Millard County Peak 3,380 (1982) Millard County Permanent 970 (1987)	Increased Population Caribou County Peak 3,750 (1982) Caribou County Permanent 850 (1987)	Increased Population Price River Valley Peak 1,130 (1985) Price River Valley Permanent 1,060 (1987) Castle Valley Peak 2,710 (1985) Castle Valley Permanent 2,580 (1987)
Increased Income (1975 dollars) Earnings Peak $41.7 million in 1982 Permanent $26.6 million in 1987 Personal Income Peak $47.5 million in 1982 Permanent $30.3 million in 1987	Increased Income (1975 dollars) Earnings Peak $40.8 million in 1982 Permanent $11.2 million in 1987 Personal Income Peak $46.5 million in 1982 Permanent $12.8 million in 1987	Increased Income (1975 dollars) Earnings Peak $46.7 million in 1982 Permanent $30.6 million in 1987 Personal Income Peak $28.6 million in 1982 Permanent $20.8 million in 1987
Housing Needs Millard County Peak 1,080 Millard County Permanent 310	Housing Needs Caribou County Peak 1,200 Caribou County Permanent 270	Housing Needs Peak 1,190 Permanent 1,130

TABLE 8-4 (concluded)

Alternative Sites Green River	 Wellington	 Nephi
	HUMAN RESOURCES (continued)	
Education--Increased Enrollment and Additional Teachers.	Education--Increased Enrollment and Additional Teachers.	Education--Increased Enrollment and Additional Teachers
Moab Peak 90 students 3 teachers Permanent 20 students 1 teachers Carbon County Peak 210 students 8 teachers Permanent 185 students 7 teachers Emery County Peak 915 students 37 teachers Permanent 915 students 37 teachers	Price River Valley Peak 790 students 30 teachers Permanent 470 students 19 teachers Castle Valley Peak 700 students Permanent 28 teachers	Juab County Peak 800 students 32 teachers Permanent 240 students 10 teachers Garfield County Peak 920 students 37 teachers Permanent 920 students 37 teachers
Additional Culinary Water Capacity (year required)	Additional Culinary Water Capacity (year required)	Additional Culinary Water Capacity (year required)
Green River With project 1980 Without 1983 Moab With project 1987+ Without 1987+ Price River Valley With project 1981 Without 1981 Castle Valley With project 1982 Without 1982	Price River Valley With project 1980 Without 1981 Castle Valley With project 1981 Without 1983	Juab County With project 1987+ Without 1987+ Garfield County With project before 1980 Without before 1980
Additional Sewer Capacity (year required)	Additional Sewer Capacity (year required)	Additional Sewer Capacity (year required)
Green River With project 1980 Without 1987+ Moab With project 1987+ Without 1987+ Price River Valley With project 1982 Without 1982 Castle Valley With project before 1980 Without before 1980	Price River Valley With project 1981 Without 1982 Castle Valley With project before 1980 Without before 1980	Juab County With project 1987+ Without 1987+ Garfield County With project before 1980 Without Before 1980
Medical Needs 1 physician and 1 dentist needed at Green River.	Medical Needs Two additional physicians and 2 additional dentists.	Medical Needs Juab County Three physicians, one dentist, additional staff and facilities. Garfield County Three physicians, one dentist, additional staff and facilities.

TABLE 8-4 (concluded)

Alternative Sites		
Delta	Soda Springs	Proposed Site
	HUMAN RESOURCES (continued)	
Education--Increased Enrollment and Additional Teachers. Millard County: Peak 810 students, 32 teachers Permanent 230 students, 9 teachers	Education--Increased Enrollment and Additional Teachers Caribou County: Peak 900 students, 35 teachers Permanent 200 students, 8 teachers	Education--Increased Enrollment and Additional Teachers. Peak 920 students, 38 teachers Permanent 860 students, 36 teachers
Additional Culinary Water Capacity (year required) Millard County: With project before 1980 Without before 1980	Additional Culinary Water Capacity (year required) With project before 1980 Without before 1980	Additional Culinary Water Capacity (year required) Castle Valley: With project 1981 Without 1983 Price River Valley: With project 1980 Without 1980
Additional Sewer Capacity (year required) Millard County: With project 1987+ Without 1987+	Additional Sewer Capacity (year required) Possibility of exceeding capacity during peak population, population would then stabilize within capacity of the system.	Additional Sewer Capacity (year required) Price River Valley: With project 1981 Without 1982 Castle Valley: With project Before 1980 Without Before 1980
Medical Needs Millard County: At least two physicians and one dentist.	Medical Needs At least one additional physician and one dentist.	Medical Needs Two additional physicians and two additional dentists.

HUNTINGTON UNIT 3--EMERY UNIT 3 OR HUNTINGTON UNITS 3 AND 4

Air quality modeling, using the Valley Model, at the Huntington Complex indicates that "no additional units can be built with or without scrubbers" (North American Weather Consultants, 1976). If one additional unit were constructed, with scrubbers, the PSD increment would be exceeded for SO_2 and the NAAQS for NO_2. Until additional monitoring data is available, construction of a third unit at Huntington is not an available alternative.

TRANSMISSION LINES

Manti Top Route

An alternative transmission line route is a second 345-kV line approximately parallel to the existing line in the Manti top corridor which runs west from Huntington power plant, across the Wasatch Plateau to near Mount Pleasant, and then north to the Camp Williams Substation. Figure 8-7 shows the route.

A comparison of the proposed Spanish Fork and the alternative Manti Top routes is presented in Table 8-5. The standard and company committed mitigating measures described in Chapter 1 would apply to the alternate route.

500-kV Lines

One 500-kV line could replace two 345-kV lines. System reliability would be considerably reduced, since a loss of the line would mean at least twice as much power lost to the system.

A 500-kV line could be built parallel to the proposed line. Towers for 500-kV lines are about 60 feet taller than 345-kV a.c. towers and would be more visible. A greater impact on scenic quality in terms of contrast would occur where the line would be visible from highway and recreational areas.

ALTERNATIVE INDUSTRIAL WATER SUPPLIES FOR EMERY UNITS 3 AND 4

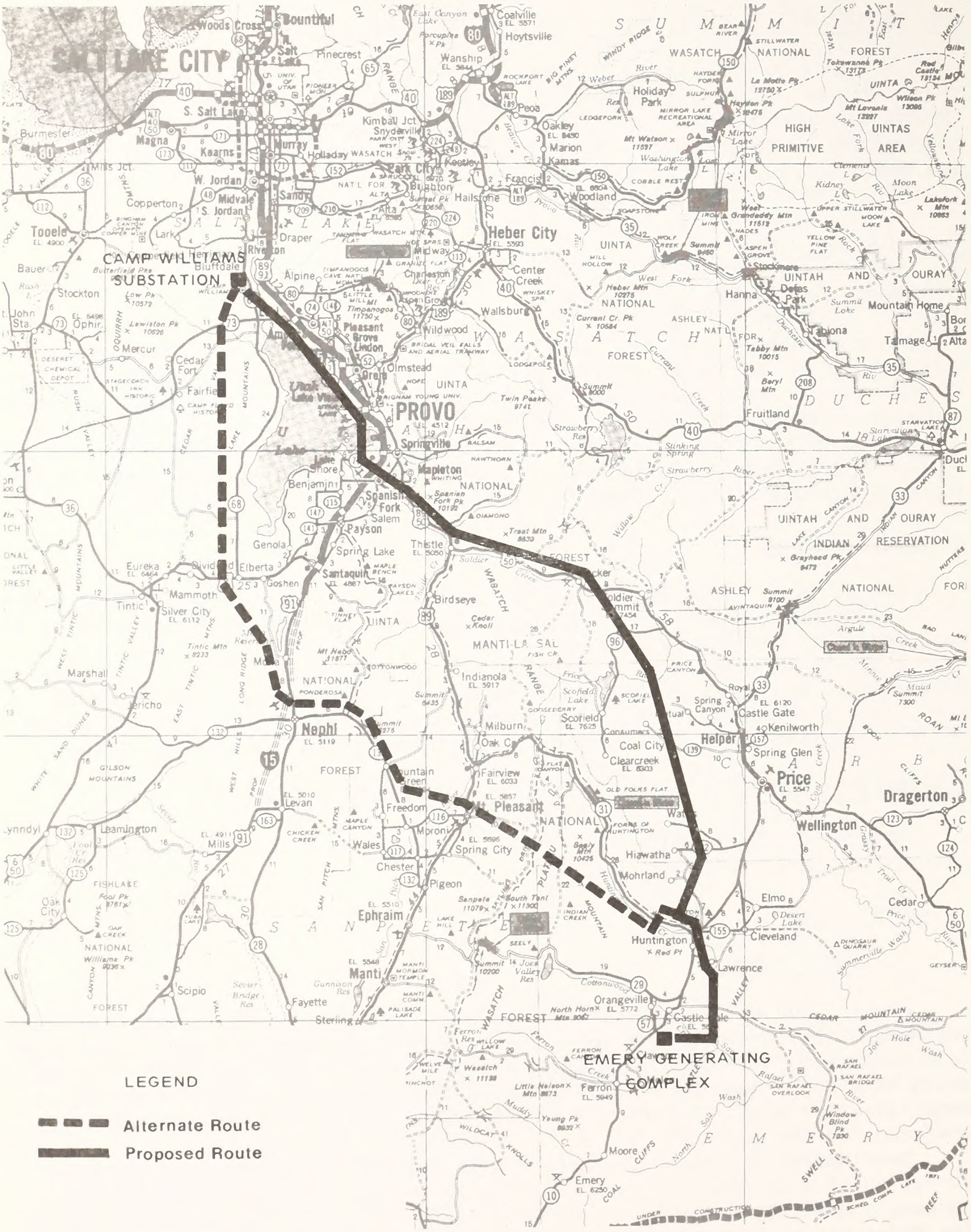
Obtaining surface water from Muddy Creek or the Green River are alternatives to the proposed water source.

Muddy Creek

Description

About 7,000 to 10,000 acre-feet of water per year could be obtained from the Muddy Creek drainage. About 7,000 acre-feet of water per year could come from undeveloped sources. Rights to the additional 3,000 acre-feet of water would have to be purchased from agricultural users. The remainder of the required water would come from the Cottonwood and Ferron Creek drainages as analyzed for the proposal.

Development of the Muddy Creek source would be dependent upon the construction of a 25,000 acre-foot capacity reservoir. The State of Utah is currently drafting plans for such a reservoir to serve multiple purpose uses. The reservoir would be located on Muddy Creek about 2.5 miles upstream from where it crosses Highway U-10. Water would flow by gravity from the reservoir to the Emery plant site, 21 miles away, through a pipeline as shown on Figure 8-8.



MANTI TOP ALTERNATIVE TRANSMISSION LINE

FIGURE 8-7

TABLE 8-5

Comparison of Manti Top Alternative
With Proposed Route

Manti Top Alternative	Proposed Route
DESCRIPTION	
Length of transmission line--126 miles	Length of transmission line--117 miles
Land Status--BLM, 23 miles	Land Status--BLM, 17 miles
USFS, 15 miles	USFS, 17 miles
	USBR, 1 mile
State, 10 miles	State, 6 miles
Private, 76 miles	Private, 77 miles
U.S. Army, 2 miles	
Right-of-way Width	Right-of-way Width
Single circuit, 130 feet	Single circuit, 130 feet
Double circuit, 100 feet	Double circuit, 100 feet
DESCRIPTION OF THE ENVIRONMENT	
Appendix VIII-9 is a profile of the route's environmental setting.	The environment is described in Chapter 2 and Appendix II-2 is profile of the route's environmental setting.
Threatened and Endangered Plants[a]	Threatened and Endangered Plants[a]
Possibly Threatened[b]	Possibly Endangered[d]
Hymenoxys depressa[c]	*Townsendia aprica*
Silene petersonii	Endangered
	Phacelia argillacea
Possibly Endangered[d]	
Lygodesmia grandiflora var. *stricta*	
Astragalus desereticus	
Wilderness	Wilderness
As many as five RARE II areas may be located along the route, but this cannot be ascertained until the exact transmission line location is known.	Three RARE II areas located along the proposed route are shown on the profile (RARE II, 4-716, 4-717, and 4-725).
BLM managed lands along the route have been reviewed for wilderness values and have been determined not to have wilderness character (see Appendix II-7).	BLM managed lands along the proposed route have been reviewed for wilderness values, and have been determined not to have wilderness character (see Appendix II-7).

TABLE 8-5 (continued)

Manti Top Alternative	Proposed Route
IMPACTS	
Soils	Soils
Route would disturb about 2 miles of municipal watershed between mileposts 44 and 46 which could cause degradation of the water quality and mass movement in a rehabilitated area.	There are no substantial identified impacts to soils.
Threatened and Endangered Plants	Threatened and Endangered Plants
Two species of possibly threatened and two possibly endangered plants could be reduced in numbers.	A possibly endangered plant could be reduced in numbers. An endangered plant could be destroyed.
Wildlife	Wildlife
Route would disturb 34 miles of critical deer winter range between mileposts 16-27, 48-53, and 56-74.	Route would disturb 48 miles of critical deer winter range between mileposts 25-41, 46-47, and 53-84.
Route would disturb 15 miles of bald eagle winter concentration area between mileposts 112-127.	Route would disturb 37 miles of bald eagle winter concentration areas between mileposts 15-38 and 66-80.
Route would disturb 13 miles of critical elk winter range between mileposts 23-36.	Route would disturb 9 miles of critical elk winter range between mileposts 37-39 and 51-58.
Route would disturb 22 miles containing deer fawning and elk calving areas between milesposts 26 to 48.	Route would disturb 20 miles containing deer fawning and elk calving areas bet-mileposts 37 to 57.
No sage grouse strutting grounds present.	Route would disturb 1 mile of sage grouse strutting ground between mileposts 50-51.
No waterfowl nesting areas present.	Stringing operations would disturb waterfowl nesting along 4 miles if conducted from March 1 to July 31 (mileposts 93-95, 100-102).
Cultural Resources	Cultural Resources
Eleven known archaeological sites could be damaged within the transmission corridor. None are eligible for nomination to the National Register of Historic Places (Hauck, 1978a; Sisson, et al., 1978).	Six known archaeological sites could be damaged within the transmission corridor. None are eligible for nomination to the National Register of Historic Places (Hauck, 1978a).

TABLE 8-5 (continued)

Manti Top Alternative	Proposed Route
Visual Resources Route would cross about 8 miles of high quality scenery in the skyline drive and Upper Joes Valley areas. Increase in contrast at highway crossings would be low.	Visual Resources Route would cross an area of concern at the mouth of Spanish Fork Canyon. Increase in contrast at highway crossings would be low.
Wilderness Construction of the transmission line on RARE II areas would impair wilderness character, but would not be allowed prior to management determinations.	Wilderness Construction of the transmission line on RARE II areas would impair wilderness character, but would not be allowed prior to management determination. Could impact three U.S. Forest Service identified roadless areas (RARE II, 4-716, 7-717, and 4-725).
Recreation The visual intrusion at the Indian Creek Campground and in Upper Joes Valley would reduce the quality of the recreation experience.	Recreation No recreational areas or campgrounds affected.
Visible to travelers in vehicles on U.S. Highway I-15 and State Highways 10, 31, 89, 132, and 73.	Visible to travelers in vehicles on U.S. HIghways 50 and 6, and State Highways 10, 31, 122, 50, and 96.

MITIGATING MEASURES

Manti Top Alternative	Proposed Route
Threatened and Endangered Plants No measure identified.	Threatened and Endangered Plants Chapter 4, Item 1 would eliminate losses of the endangered plant species.
Animal Life Chapter 4, Item B would mitigate the disturbance of critical elk and deer winter range on federal land between mileposts 16-27 and 56-74 and disturbance to wintering bald eagles between mileposts 126-127.	Animal Life Chapter 4, Item 2 would mitigate the impacts on wildlife on federal land.
Use helicopters to erect towers and string conductors where access across the natural terrain or management constraints preclude standard construction methods.	Use helicopters to erect towers and string conductors where access across the natural terrain or management constraints preclude standard construction methods

TABLE 8-5 (concluded)

Manti Top Alternative	Proposed Route
ADVERSE IMPACTS WHICH CANNOT BE AVOIDED	
Threatened or Endangered Plants Possibly threatened or endangered plants could be reduced in numbers or some of their essential habitat destroyed.	Threatened or Endangered Plants Possibly threatened or endangered plants could be reduced in numbers or some of their essential habitat destroyed.
Wildlife Disturbance of deer and elk winter range on private lands could occur (mileposts 25-26, 27-28, 48-53, 56-62, 73-74).	Wildlife Disturbance of deer and elk winter range on private lands could occur (mileposts 25-26, 31-41, 46-47, 53-54, 56-58, 73-74, 79-80, 83-84).
Disturbance of deer fawning and elk calving areas could occur (mileposts 26-48).	Disturbance of deer fawning and elk calving areas could occur (mileposts 38-54, 56-58).
No sage grouse strutting grounds present.	Disturbance of sage grouse strutting grounds could occur on private lands (mileposts 50-51).
Harassment of bald eagles could occur on private lands between milepost 112-126.	Harassment of bald eagles could occur between mileposts 24-38 and 66-80.
Cultural Resources Even with full implementation of proposed mitigating measures, some losses would occur due to vandalism and construction.	Cultural Resources Even with full implementation of proposed mitigating measures, some losses would occur due to vandalism and construction.
Visual Resources Areas of high quality scenery would be crossed in the Skyline Drive and Upper Joes Valley areas. Increase in contrast at highway crossings would be low.	Visual Resources The quality of the scenery at the mouth of Spanish Fork Canyon would be degraded. Increase in contrast at highway crossings would be low.
Recreation The aesthetic quality of the recreational experience in Upper Joes Valley and at the Indian Creek Campground would be reduced.	Recreation No issue identified.

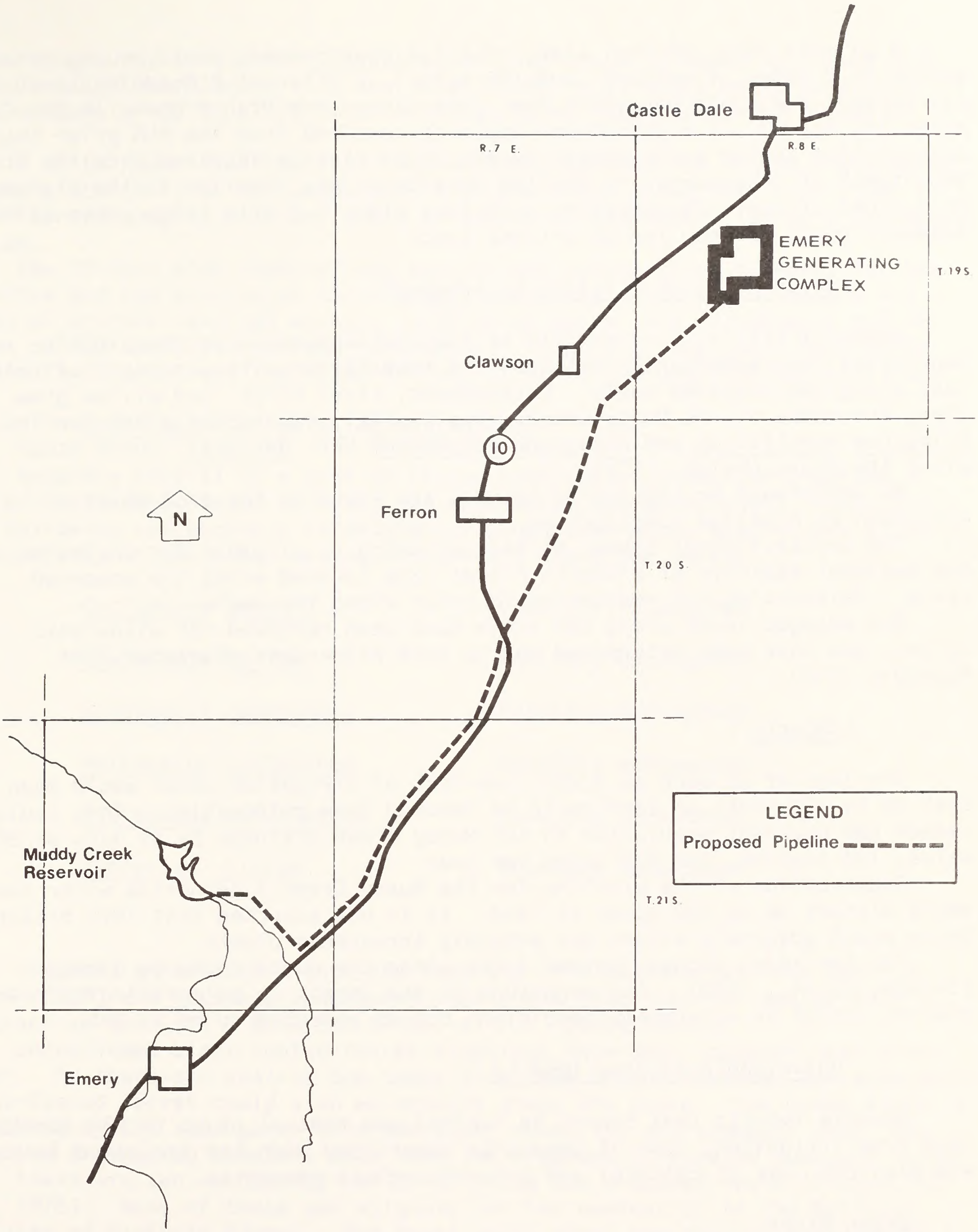
---

[a] Source: Welsh, 1978.

[b] T--Threatened-1975 Smithsonian list, 40 F.R. 27824-27924.

[c] Recommended for inclusion on list, S. L. Welsh, 1978b.

[d] E--Endangered-1975 and/or 1976 Smithsonian list, 40 F.R. 27824-27924, 41 F.R. 24524-24572.



PROPOSED PIPELINE:
MUDDY CREEK RESERVOIR TO EMERY POWER PLANT

FIGURE 8-8

A 21 mile long, 50-foot wide, pipeline right-of-way would be required across 11.2 miles of private land (68 acres), 2 miles of BLM-administered land (12 acres), and would be within the right-of-way for Utah Highway 10 for 7.8 miles (47 acres). A right-of-way would be required from the BLM prior to construction and an encroachment permit would also be required from the Utah Department of Transportation for the portion of the pipeline in the Highway U-10 right-of-way. In addition, a 25-foot wide, 9.9 mile long construction easement would be required on private land.

Description of Existing Environment

Appendix VIII-10 is a profile of the environment along the pipeline route. Vegetation is predominantly saltbush and rabbitbrush with some agricultural land along the proposed route. Cottonwoods, river birch, and willow grow along the banks of the Muddy Creek. Two possibly endangered plant species, *Eriogonum lancifolium* and *Eriogonum corymbosum* var. *davidsei*, could occur along the route (Welsh, 1978).

No threatened or endangered animals are known in the area which would be disturbed by pipeline construction.

Two archaeological sites, neither of which is eligible for inclusion on the National Register of Historic Places, are located along the proposed route. Paleontological remains could occur along the route.

BLM managed lands along the route have been reviewed for wilderness values, and have been determined not to have wilderness character (see Appendix II-8).

Impacts

The loss of as much as 3,000 acre-feet of irrigation water would mean that up to 732 acres of land could be removed from cultivation. This could reduce the pheasant population in the Muddy Creek drainage by as many as 86 males, 103 females, and 422 young per year.

Construction of the pipeline for the Muddy Creek alternative water source would disturb up to 160 acres of land. It is not expected that this disturbance would adversely affect any possibly threatened plants.

The two known archaeological sites along the route could be damaged (Sisson, et al., 1978). The magnitude of the impact to paleontological resources cannot be accurately predicted, but is expected to be slight.

Unavoidable Adverse Impacts

Adverse impacts that cannot be avoided are removal of up to 732 acres of land from irrigation, loss of pheasants associated with the irrigated lands, and possible loss of cultural and paleontological resources.

Green River

Description of Alternative

The entire 14,000 acre-feet of water needed annually for Units 3 and 4 could be obtained from the Green River. Water would be diverted from the Green River into the reservoir described for the alternative plant site at Green River (Figure 8-2). It would then be pumped 33 miles to the highest point of the proposed pipeline (east of Buckhorn Flat) and would flow 26.7

miles by gravity to the Emery plant site. The route is shown in Figure 8-9. Eight booster pumps would lift the water 2,180 feet, and a small reservoir (approximately 100 ft x 100 ft x 10 ft) would be required at the highest point.

A 25-kV power distribution line, designed as shown in Figure 8-10, would supply electricity to the pumps and other equipment along the line. The pipeline and pumping stations would be monitored and controlled by a telemetry system.

The 50-foot wide right-of-way and 25-foot construction easement for the pipeline and the associated 25-kV power line would cross approximately 3.5 miles of private land (21 acres), 12 miles of state land (73 acres), and 44 miles of BLM-administered land (267 acres). Rights-of-way would need to be granted by the BLM and the State of Utah prior to the pipeline construction.

Description of Existing Environment

Appendix VIII-11 is a profile of the environment along the pipeline route. Saltbush, pinyon-juniper, and greasewood are predominant vegetation. The following six possibly threatened or endangered plant species are known in the vicinity of the pipeline and could occur along the route:

Cycladenia jonesii	Possibly endangered
Townsendia aprica	Possibly endangered
Cryptantha johnstonii	Possibly endangered
Astragalus pardalinus	Possibly endangered
Astragalus rafaelensis	Possibly threatened
Asclepias ruthiae	Possibly threatened

Possibly threatened plants are from the 1975 Smithsonian list (40 F.R. 27824-27924) and possibly endangered plants are from the 1975 and/or 1976 Smithsonian list (40 F.R. 27824-27924, 41 F.R. 24524-24572).

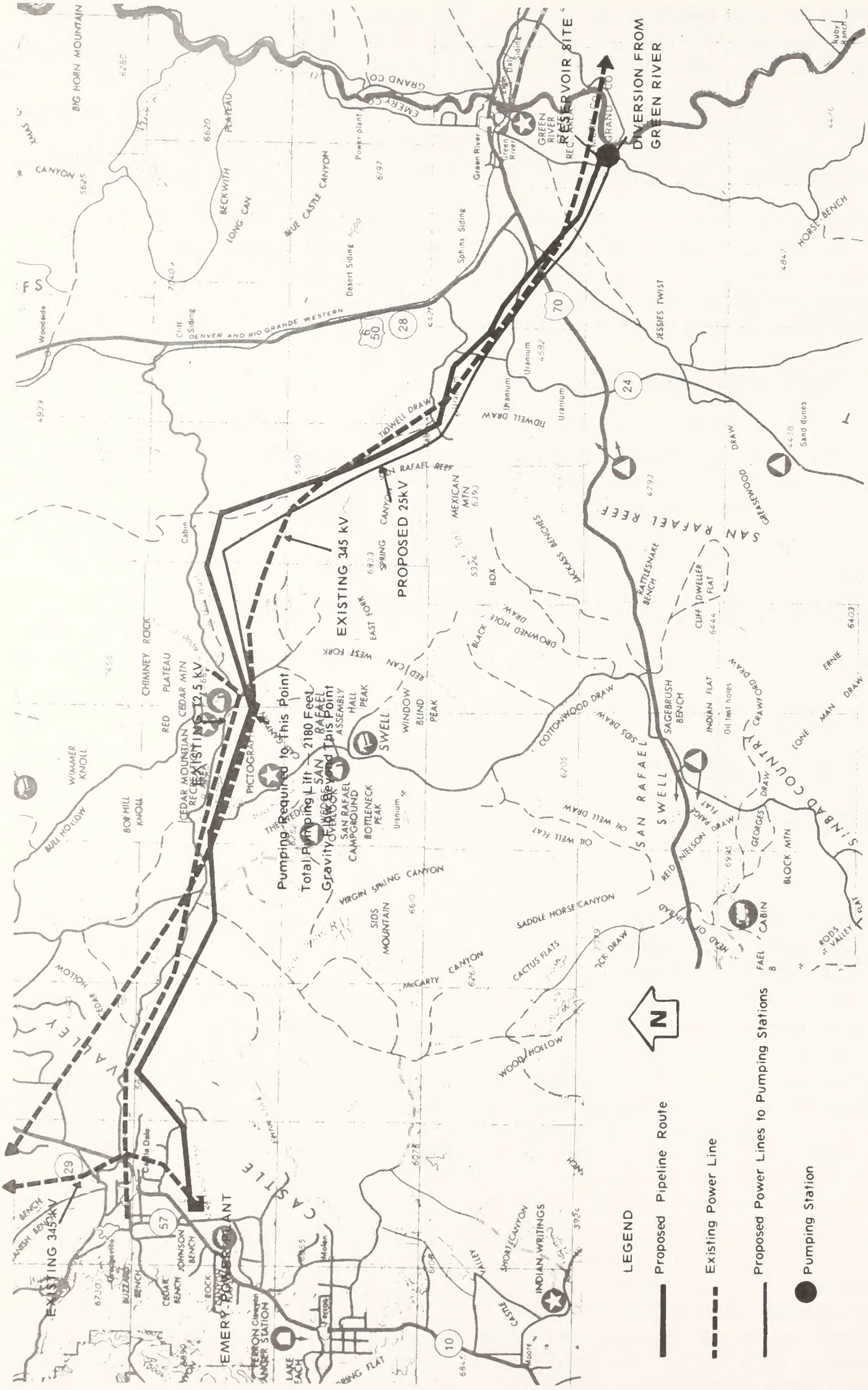
Unconfirmed black-footed ferret sightings have been recorded near Green River. As there are prairie dog towns along the proposed route, the endangered black-footed ferret could also be present along the route. The Green River is inhabited by the endangered Colorado River squawfish and humpback chub, the proposed endangered bonytail chub, and the proposed threatened humpback sucker.

There are ten archaeological sites along the proposed route (Sisson, et al., 1978). None of these are eligible for the nomination to the National Register of Historic Places. The route would cross the Spanish Trail which is eligible for nomination to the National Register of Historic Places.

Paleontological remains occur along the proposed route, especially in the Morrison geologic formation (Miller, 1978a).

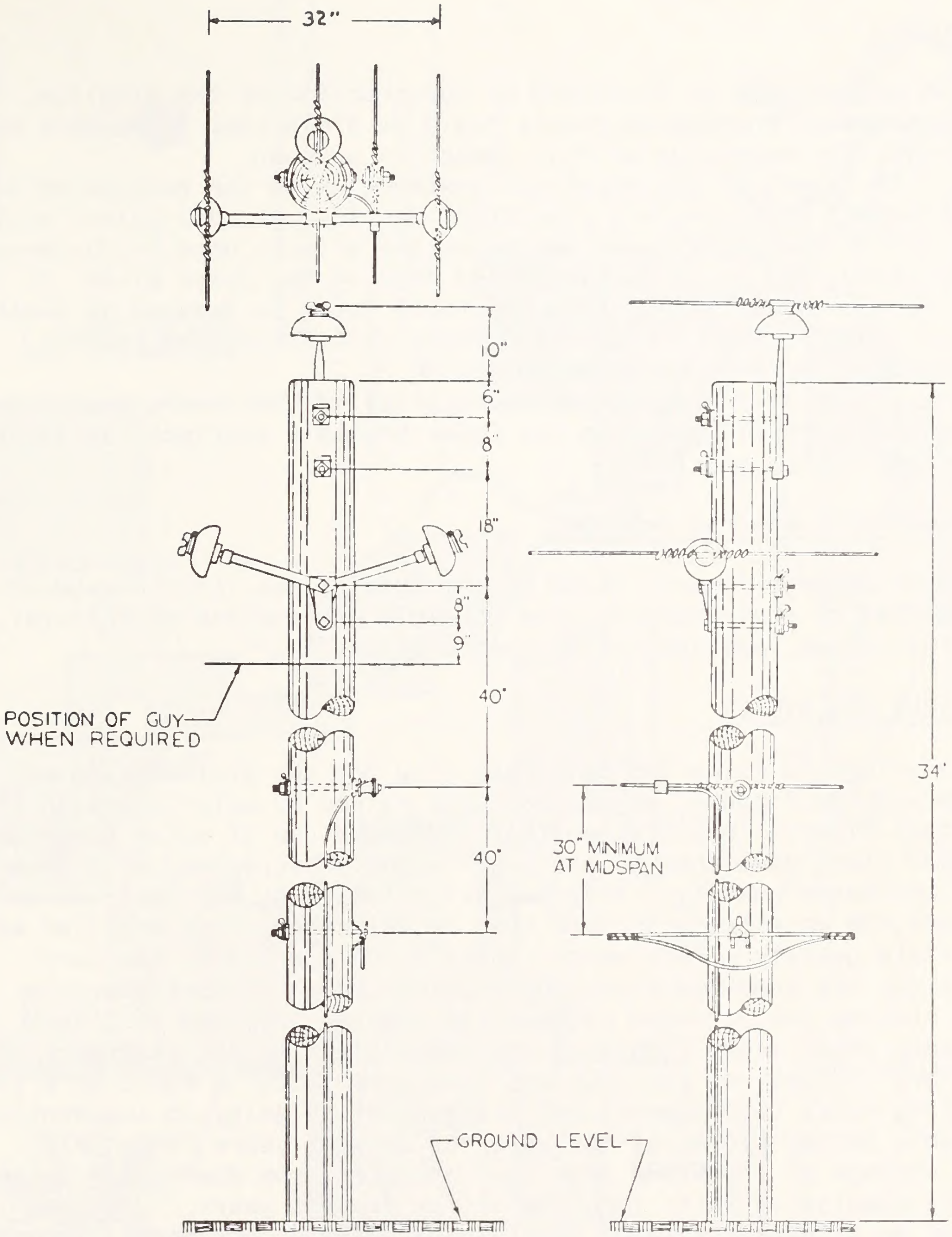
The route would be visible from the Cedar Mountain Overlook and from an important recreation access route to the San Rafael Swell across Buckhorn Flat. The pipeline would cross Interstate 70, a designated scenic highway.

BLM managed lands along the route have been reviewed for wilderness values and have been determined not to have wilderness character (see Appendix II-7).



GREEN RIVER WATER PIPELINE

FIGURE 8-9



TYPICAL UTILITY POLE CONFIGURATION

FIGURE 8-10

Impacts

Up to 545 acres could be disturbed by construction of the pipeline. Possibly threatened or endangered plants could be diminished in numbers by this disturbance; the magnitude of that impact is unknown.

Although the impact of the pipeline construction on the endangered black-footed ferret cannot be accurately predicted, any loss of this animal would be significant. It is not possible to determine the effects upon the endangered, proposed endangered, and proposed threatened fish in the Green River.

The 10 archaeological sites along the route could be damaged by construction activity. Construction would also disturb paleontological remains. A portion of the Spanish Trail could be damaged.

The construction scar would alter the quality of the scenic view and lessen the aesthetic experience from the Cedar Mountain overlook, an important recreation access route, and I-70.

Unavoidable Adverse Impacts

Unavoidable adverse impacts would be any loss of possibly threatened or endangered species or their habitat, the possible destruction of cultural and paleontological values, and loss of aesthetic values.

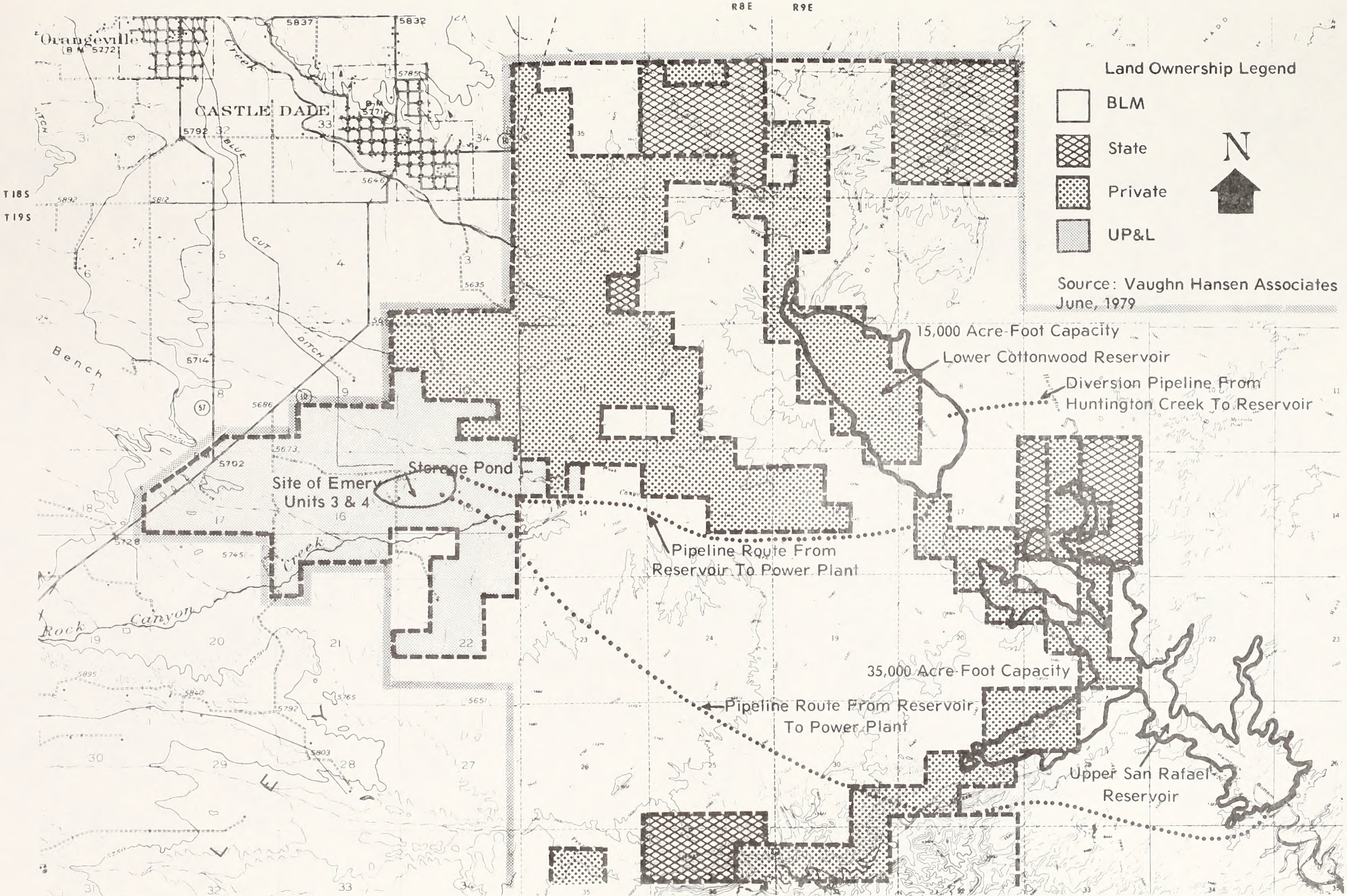
SAN RAFAEL RIVER RESERVOIRS

During hearings in Price and Salt Lake City for the Draft Environmental Statement Emery Units 3 and 4, objections were raised by water users on the lower San Rafael River. They claimed that increased use of water upstream, including power plant development, was significantly decreasing both their water supply and water quality. They suggested that UP&L buy their water rights (about 6,038 acre-feet) or that they be delivered their entitled water at an appropriate quality. Were water rights to be purchased, the power company would use the acquired rights by storing the water upstream. In addition the storing the acquired rights, the company proposed to divert existing company owned water rights in the Green River to the reservoir sites.

Preliminary indications are that UP&L would be 3,000 to 4,000 acre-feet short of cooling water requirements for all generating units at the Huntington and Emery plants during cycles of low water or drought years (VHA, 1979). The purchase and storage of the 6,038 acre-feet of water from downstream water would meet the cumulative water requirement for drought years. UP&L has requested that an alternative water supply reservoir be considered, in order to store the additional 6,038 acre-feet of purchased water rights, to provide 3,000 to 4,000 acre-feet reserve for drought years, and to provide an emergency "back-up" water supply for the Emery and Huntington plants. Two potential reservoir sites, Cottonwood and Upper San Rafael shown on Figure 8-11, have been identified in the vicinity of the Emery generating station.

Cottonwood Reservoir

The Cottonwood Reservoir would be in Emery County, Utah on the Cottonwood Drainage of the San Rafael River. The reservoir would be located approximately 2 miles upstream from the confluence of the Huntington and Emery creeks (see Figure 8-11). Approximately 15,000 acre-feet of water would be stored in a reservoir that would occupy about 575 acres at maximum water levels. UP&L would acquire the water that would be impounded in the Cottonwood Reservoir


Land Ownership Legend
BLM
State
Private
UP&L
N
Source: Vaughn Hansen Associates June, 1979
15,000 Acre-Foot Capacity
Lower Cottonwood Reservoir
Diversion Pipeline From Huntington Creek To Reservoir
Storage Pond
Site of Emery Units 3 & 4
Pipeline Route From Reservoir To Power Plant
35,000 Acre-Foot Capacity
Pipeline Route From Reservoir To Power Plant
Upper San Rafael Reservoir
Orangeville
CASTLE DALE
Rock Canyon
Creek
Bench
BLUE CUT DITCH
R8E
R9E
T18S
T19S

ALTERNATE POTENTIAL RESERVOIR SITES ON LOWER COTTONWOOD CREEK & UPPER SAN RAFAEL RIVER

FIGURE 8-11

from two sources. About 6,038 acre-feet would be purchased from private water users on the Upper and Lower San Rafael River and on Lower Cottonwood, Ferron, and Huntington Creeks. The remaining 8,962 acre-feet would come from a transfer of UP&L water rights from the Green River to the tributary San Rafael River. Table 8-6 shows the reservoir's surface acreage requirements by ownership. Access is available to the site by way of an existing county maintained road.

Water would be transmitted to the power plant site via a 4.05 mile 24-inch pipeline in a 50 foot right-of-way. A second 24-inch pipeline, 0.74 miles long, would be constructed to transfer water from Huntington Creek to the reservoir. Table 8-6 also shows the approximate miles and acreage requirements by ownership for the pipelines. Utah Power and Light would purchase private property and obtain needed rights-of-way on public land. Approximately 290,000 cubic yards of fill materials would be excavated from within the reservoir area to construct the dam.

The 15,000 acre-feet of water would be impounded behind the dam over a two year period. The reservoir would be used only as an emergency supply reservoir and no water would be used during normal water years. All of the normal water flow in the Cottonwood Creek and San Rafael River except 5 percent evaporation from the Cottonwood Reservoir (VHA, 1979) would continue downstream.

Description of the Existing Environment

Geology-Topography

Geology in the reservoir area consists of mesozoic formations which weather to produce clay, silt, sand, and sandy silts which are each more or less laden with soluble salts. The dam would be located on the Cedar Mountain formation and water would back up onto the Cedar Mountain and Dakota formations. All of which are Mesozoic in age.

The pipelines would cross five formations, including portions of the Dakota Formation and the Tununk, Ferron, and Blue Gate members of the Mancos Formation.

Water Resources

Assuming the Huntington plant and all four Emery units are in operation, the present average annual flow of Cottonwood Creek at the reservoir site would be 17,520 acre-feet. The average flow of the San Rafael River below the dam site would be 33,800 acre-feet and the salinity of the water would be 1,850 mg/ℓ, with extremes of about 400 to ,8000 mg/ℓ during high flow and low flow water years or seasons. Annual salt load in the San Rafael River below the reservoir site would be 145,000 tons during a normal season.

Vegetation

Plant communities occur in two main types--riparian along the stream and grass-forb-brush at dryer sites along the river. Riparian vegetation is made up of Fremont poplar (cottonwood), sandbar willow, and salt cedar (tamarix). Shadscale, nuttals saltbush, mat-saltbush and galleta grass are the dominant species at the dryer site. Appendix II-3 shows general vegetation types in the area.

Assuming the riparian vegetation near the reservoir site is 100 feet wide, approximately 24 acres of riparian vegetation are within the proposed reservoir site.

TABLE 8-6

Requirements of the Cottonwood Reservoir
By Ownership

Ownership	Reservoir	Pipeline	
	Acres Occupied	Miles	Acres Right-of-Way
Private	395	0.5	3.0
State	0	0	0
BLM	180	3.29	19.9
UP&L	0	1.0	6.1
Total	575	4.79	29.0

Cottonwood Creek, for about 2.5 miles exists below the proposed dam site to the confluence of Huntington Creek, supports an additional 30 acres of riparian vegetation.

The threatened and endangered plant species that could occur in the vicinity of the reservoir are: *Eriogonum lancifolium*, *Eriogonum corymbosum* var. *davidsei*, *Townsendia aprica*, and *Castilleja sabrida* (Federal Register lists 1975-76 [see Welsh, 1978]). *Castilleja sabrida* which occurs in the area, was placed on the list in error as threatened and is, in fact, widely known in southern Utah and is locally abundant (Welch, 1978).

Animal Life

Aquatic

Low densities of Colorado chub, speckled dace, flannel mouth, and bluehead suckers exist in the San Rafael River and its tributaries near the Upper San Rafael Dam site. No game fish live in the San Rafael River with the exception of some catfish (McAda, et al., 1977).

Terrestrial

The Cottonwood Reservoir and pipeline area is used by ringnecked pheasant, cinnamon teal, mourning dove, beaver, muskrat, mule deer, occasionally antelope, Audubon cottontail, California jackrabbit, cottontail rabbit. The cottonwood trees along the stream provide nesting, roosting, and perch habitat for owls and other tree birds. The riparian vegetation along this desert stream is extremely important and supports higher wildlife concentrations than other vegetation types.

Wildhorses and Burros

No wild horses or burros range within the vicinity of the reservoir site.

Threatened or Endangered Wildlife

There are no threatened animal species within the reservoir site or along the water supply pipeline. Endangered animal species that may exist near the reservoir site are the peregrine falcon, bald eagle, and black-footed ferret. The nearest known nesting area, used by the peregrines since 1970 is downstream 30 miles along the San Rafael River. The area is not currently used. The entire San Rafael drainage, however, has potential for peregrine habitat.

The bald eagle may use the cottonwood trees along the Cottonwood Creek as winter roosting areas. There are no specific sites identified in the area.

The black-footed ferret could be associated with the prairie dog towns in the area of the pipelines. The actual existence of ferrets in western Emery County has not been confirmed.

The endangered Colorado squawfish may occasionally be found at the confluence of the San Rafael and Green Rivers (McAda, et al., 1977).

Cultural and Paleontological Resources

Twelve cultural resource sites exist within the Cottonwood site and along the pipelines. These are mainly lithic scatters of low significance. However, five sites are potential National Register properties (Drollinger, 1979).

Paleontological remains occur within the Dakota and Cedar Mountain formations in the project site. The dam would be constructed in the Cedar Mountain Formation on a site where several upright in place Tempskya ferns and fossil leaves have been collected (Tidwell, 1979). The site is of scientific value for further study and of educational value as a collecting site for students of paleontology. The fossil remains of plant life from the early Cretraceous period are important for scientific study because this period is the transition from non-flowering to flowering plant types.

Scenic Resources

The Cottonwood Reservoir is within a stream valley bottom type area in a desert valley setting. It is in a background visual zone in an area of Class C scenery and medium sensitivity (see Appendix II-6 for definition of terms). The reservoir site is visible from Highway U-10. The San Rafael River is visible from the Wedge Overlook.

Minerals

Excluding oil and gas, the only minerals of potential value on lands covered by the reservoirs are coal and uranium. The coal bearing formations are the Cretaceous Dakota and Ferron Sandstones. The Ferron coals are not present at the Cottonwood Reservoir site and the Dakota coals are so thin and disected that they are non-commercial.

The nearest uranium occurrence is located south of Ferron Creek and is known as the Ronda or Rebecca Knolls prospect. It consists of less than 100 tons of ore varying from 0.05 to 10 percent uranium oxide. Larger deposits are unlikely in the area because of the paucity of sandstone host rocks.

Land Uses

Agriculture and Livestock Grazing

The reservoir would inundate approximately 180 acres of irrigated cropland, along with some farm buildings and ranch house, in the Cottonwood Drainages and approximately 395 acres of grazing land. The principal crop grown is alfalfa but some small grains are also grown. The annual yield is about 3 tons of alfalfa hay per acre or about 57 bushels of grain per acre per year (Utah Bureau of Agricultural Statistics, 1978). The rangelands and riparian habitat along the Cottonwood Creek and within the project area produce approximately 37 AUMs or enough forage to sustain about 6 cattle and calves for about 6 months (BLM, 1979).

The reservoir would store water purchased from approximately 1,076 acres of cropland in the surrounding area and downstream. The cropland would then be retired from crop production and converted perhaps to grazing and rangeland.

An official designation by the Soil Conservation Service has not been made as to whether the croplands in this area are prime, unique, or of statewide importance. (For a definition of these terms, see Appendix II-7 farmland categories.)

Recreation

The San Rafael River is largely dependent upon Cottonwood Creek for its flow and provides floatboating opportunities from Fuller's Bottom through the

Black Box during the high spring runoff season. BLM's San Rafael Bridge Campground, used heavily during the spring season, is located on this segment of the river (San Rafael Unit Resource Analysis, 1978). Total visitor use on this segment of the river, including the cambground, is estimated to be 900 visitor days annually (Wing, 1979).

Special Designation Areas

BLM lands that would be directly affected by the proposed reservoir have been reviewed for wilderness values and have been determined not to have wilderness character (see Appendix II-8).

The portion of the San Rafael River through the northern end of the San Rafael Swell from Fuller's Bottom to the Black Box has been identified as having potential for Wild and Scenic River Designation (San Rafael Management Framework Plan, 1979). This segment of the river is dependent upon Cottonwood, Huntington, and Ferron creeks for its water flow.

Mining

There are no active uranium or coal mines nor any record of previously active mines on lands that would be inundated by the reservoir or about the pipeline routes. These are no known mining claims in the immediate area (Britt, 1979).

Land Use Plans and Controls

The resources on federal lands in the San Rafael area are managed by policies and guidelines of Management Framework Plans developed by the BLM. The San Rafael Planning Unit Resource Analysis, 1978 and analysis work done in the River Management Plan (San Rafael River, 1978) also gives direction to management of the area. No management restrictions on the reservoir site are listed in BLM, state, or local land use plans.

Human Resources

The present employment, population, and income in Emery County is described in the Human Resources section of Chapter 2.

The 1,076 acres of cultivated cropland which would be affected by the Cottonwood Reservoir are presently providing approximately 10 jobs, based on approximately 0.009 jobs per acre and could produce about $161,400 of income per year (Wistison, 1979.

A ranch house (occupied during part of the year) is located on the reservoir site.

Envivonmental Impacts

Introduction

There are no specific mitigating measures beyond the company proposed and the federal government requires as standard measures described in Chapter 1. The adverse impacts that have been identified and described in this section are therefore considered to be unavoidable impacts. Only those environmental components that are significantly affected are discussed here.

Water Resources

The annual flow of Cottonwood Creek into the reservoir would equal 800 acre-feet during a dry year. Evaporative losses from the Cottonwood Creek Reservoir would be the primary water quantity impact resulting from the reservoir. A net average annual loss of 1,635 acre-feet of water would result from the construction of the reservoir. The reduction in stream flow in the San Rafael River would normally be less than 5 percent of the projected flow. During dry years, however, up to 13.4 percent of the flow could be lost. Cottonwood Creek below the reservoir would likely be dry during periods of drought for approximately 0.75 mile to the confluence of Cottonwood and Rock Canyon creeks.

The proposed reservoir would increase total dissolved solid (TDS) concentrations in the San Rafael River Basin due to evaporation, but also reduce total salt loads by eliminating irrigation return flow from retired agricultural lands. Initially, some salt would be added to the water in the reservoir as the salt in the Mancos Shale derived soils is dissolved. When the reservoir first spills the high spring flows of relatively good quality, the temporary salt concentration would be diluted.

The TDS concentration in the San Rafael River near Castle Dale could increase from 3,150 mg/ℓ to 3,290 under normal conditions and 5,150 to 5,630 mg/ℓ under drought conditions.

The proposed reservoir should decrease the salinity of the Colorado River because, while TDS concentrations would be higher, the total of salts would decrease. About 930 fewer tons of salt would be delivered to the Colorado River by removing 1,076 acres from irrigation. This would result in a decrease in TDS concentrations of the Colorado River at Lee's Ferry of 0.7 mg/ℓ (VHA, 1979).

During drought years, salt laden water would be pumped out of the river system and used at the plant, would further decreasing the total salt load carried into the Green and Colorado rivers.

Vegetation

The reservoir would cover about 575 acres. Approximately 4 percent is riparian, 65 percent is desert salt shrub, and 31 percent is agricultural. The water supply pipeline would temporarily disturb 29 acres of salt desert shrub.

Little research has been done on salt tolerant natural riparian vegetation, but according to Oka, et al. (USBR, 1979), natural vegetation probably would respond to salinity changes much like agriculture crops, i.e., germination is affected in plants in concentration greater than 700 p/m, but plants are unaffected in growth up to 5,000 p/m. The riparian species along the Cottonwood Creek are reproduced and spread by suckering and sprouting so salinity fluctuations or increases probably would have little affect until concentrations reach much higher levels then predicted.

Impacts to threatened or endangered plant species which may occur in the area (*Eriogonum lancifolium*, *Eriogonum corymgosum* var. *davidsei*, and *Townsendia aprica*) cannot be fully analyzed at this time because their distribution and response to soil and water salinity is unknown. None of these plants are located in the riparian zone.

Animal Life

Aquatic

The aquatic habitat would be degraded by a 5 to 10 percent increase in TDS concentrations. The stream is expected to stablize at about 3,290 mg/ℓ (VHA, 1979). Existing fish species could tolerate the increase, but microorgansims used by the fish species probably would be reduced. Reduced or eliminated flows on 2 1/2 miles of Cottonwood Creek would completely eliminate all fish populations and aquatic habitat. This could happen when the reservoir is filled and during drought years. With continuation of water flow, the aquatic habitat would be reestablished within 1 year.

The new reservoir would create new habitat for rough fish species because they can tolerate up to 15,000 p/m TDS (EPA, 1976), but would not be suitable for game fish because their upper limit is 1,500 mg/ℓ TDS (Livesay, 1979).

There are no game fish or threatened or endangered species in the San Rafael River, but formal consultation has been initiated with the U.S. Fish and Wildlife Service on the effects of the reservoir and increased TDS on the Green River habitat for two threatened and endangered species of fish, Colorado River squaw fish and humpback chub.

Terrestrial

About 150 acres of pheasant habitat would be destroyed by inundation of the reservoir. The habitat along the creek does not provide good cover for nesting ducks, but the reservoir would provide approximately 600 acres for waterfowl feeding and nesting in an area with a total of only 2,600 acres of waterfowl habitat (Jensen, 1974). The reservoir would destroy habitat for mule deer, rabbit, and other species. The area involved would be less than 0.001 percent of the available habitat Emery County.

Wild horses and burros do not inhabit the area near the Cottonwood Reservoir site.

No active peregrine falcon eyries or bald eagle areas or populations of black-footed ferret are known to occur in the reservoir area or along the pipelines. The continued existence of these species is not likely to be jeopardized by the construction of the reservoir.

Formal consultation with U.S. Fish and Wildlife Service on the effects of the reservoir and pipelines on endangered species has been initiated.

Cultural and Paleontological

Major Impacts

Major impacts to archaeological and paleontological resources would be prevented by implementation of standard requirements described in Chapter 1.

The reservoir and pipeline would affect important paleontological fossils of the Cedar Mountain Formation. New access to sensitive areas would result in partial destruction or total loss of scientific information. The amount and significance of lost value cannot be accurately predicted. Damage to subsurface values not initially discovered through field inventories, could occur through ground disturbance during construction. Even if salvage were performed, an unknown amount of scientific evidence would be lost due to current salvage techniques.

Scenic Resources

The reservoir would be visibile (low contrast) from Utah Highway 10. It would add variety to the landscape, and would generally improve aesthetic values. At low water years, the aesthetic values would be reduced by mud flats and reservoir draw down.

Loss of water in the San Rafael River could result in a decrease in the aesthetic value of the area as viewed from the Wedge Overlook.

Land Use

Agriculture and Livestock Grazing

An annual maximum of about 6,038 acre-feet of irrigation water would be acquired from local farmers to supply the additional needs of the generating complex could result in retirement of up to 1,076 acres of agricultural land or 2 percent of the cropland in Emery County. It is estimated that agricultural land retirement could result in a total annual loss of 3,228 tons of alfalfa hay or 61,332 bushels of barley or oats. Changes in land use as a result of converting water from agricultural to industrial use could impair the ability of ranch property to support livestock while they are not on federal land. The exact location and magnitude of these lands use changes is unknown.

The total livestock forage loss through inundation, on the Jorgensen and TDJ BLM grazing allotments, would be 37 AUMs.

Recreation

Storage and removal of water from Cottonwood Creek would reduce water flow in the San Rafael River during the high flow spring months when recreational use is at its peak. Less water in the San Rafael River during spring months could reduce the length and quality of floatboating and water play opportunities.

The reservoir would provide opportunities for sailboat, motorboating, and waterfowl hunting. Sufficient recreation sites of better quality are already available in the area and it is unlikely that federal, state, or local goverment agencies would have sufficient funds to develop and manage for the recreational potential of the lake.

Special Designation Area

Wilderness

There would be no impact to wilderness values.

Wild and Scenic River

Storage and removal of water from Cottonwood Creek would reduce water flow in the San Rafael River and could reduce its potential for Wild and Scenic River designation.

Mining

Any future mining options would be lost in the area of inundation and pipeline construction. However, no known potential coal or other mineral deposits exist at the site and only low potential uranium formations exist.

There are no known mineral claims in the Cottonwood Reservoir area.

Land Use Plans and Controls

The BLM San Rafael Planning Area MFP recommends the San Rafael River for study as a wild and scenic river. Reduction of water flow could reduce the potential of the river for Wild and Scenic River designation.

The reservoir or pipelines do not otherwise conflict with general management policies and guidelines in the BLM, state, or local land use plans.

Human Resources

Employment/Population/Income

Table 8-7 contains projections of direct and indirect employment for 1983 and 1984 for the Cottonwood Reservoir dam and pipeline.

The average annual incremental population would be 30 in 1983 and 75 in 1984 for the Cottonwood Reservoir. These projections of population are based on the assumption that many of those employed would not be residents of Carbon or Emery counties and would not bring their families because of the temporary and seasonal nature of the job.

Total earnings (wages and salaries, other labor income, plus proprietors income) is projected to be $233,000 (in 1975 $) in 1983 and $616,000 in 1984 if the Cottonwood Reservoir is constructed.

As shown in Table 8-8, it is estimated that the average annual reduction in agriculture employment would be 10 people if the Cottonwood Reservoir is constructed. These estimates of the reduction of agricultural employment are maximum estimates based upon retirement of 1,076 acres of cropland.

It is estimated that the value of agricultural production lost due to construction of the Cottonwood Reservoir would be about $161,400. These estimates are based on the assumptions that the land involved produces 3 tons of hay per acre and the value of this hay is assumed to be $50 per ton.

Quality of Life

Compensation would be given to the ten owners whose water rights and land are sold to Utah Power and Light in order to construct the reservoir. There would be significant changes in family life styles if the land retired is used for the sole livelihood of those affected. Some of the acreage is small and the landowner may have to get supplemental employment to sustain the family. Others may be affected enough to require retraining for new employment.

If the Cottonwood Reservoir were built, a few farm buildings and a ranch house (which is occupied during part of the year) would be inundated. If the present owners attach sentimental value to these buildings and the surrounding land, then current "market" prices for these buildings may not seem, at least to the present owners, to be adequate compensation for their loss.

There appears to be no significant impact on the quality of life of the residents in the non-agricultural sectors of the economy.

TABLE 8-7

Average Annual Incremental Direct and Indirect Employment, Population, and Income Related to Construction of Reservoir and Pipelines

	Cottonwood Reservoir 1983	Cottonwood Reservoir 1984
Employment		
Direct[a]	9	24
Indirect	4	10
Total	13	34
Population (maximum)	30	75
Earnings (1975 $)[b]	$233,000	$616,000

[a] Based on preliminary engineering estimates.

[b] Wages and salaries, other labor income plus proprietors income by place of work.

TABLE 8-8

Reduction in Agricultural Employment Related to Construction of Alternative Reservoirs

Cottonwood Reservoir	Average Annual Employment (Maximum)
Lower San Rafael Area	5
Upper San Rafael Area	5
Total	10

Source: Based on acreage given in Table 8-6.

Upper San Rafael Reservoir

Description

The Upper San Rafael Reservoir dam would be in Emery County, Utah on the San Rafael River approximately 1 1/4 miles south and east of the confluence of the Huntington River, and Cottonwood and Ferron Creeks (See Figure 8-11). Up to 35,000 acre-feet of water could be stored in the reservoir which would occupy about 1,160 acres at maximum water level. Table 8-9 lists the surface acreage requirements of the reservoir by ownership. The company would purchase private property and obtain needed rights-of-way on public land. Access to the dam site would require about 5.8 miles of 16 foot wide right-of-way which would follow an existing dirt road between Buckhorn Flat and the San Rafael River.

Water would be conducted to the power plant site via a 7.7 mile long 24-inch pipeline within a 50 foot wide right-of-way. Table 8-9 lists the approximate acreage requirements by ownership for the pipeline.

Approximately 230,000 cubic yards of fill materials for the dam would be excavated from within the reservoir area.

The 35,000 acre-feet of water would likely be impounded behind the dam over a 2 to 4 year period. UP&L would acquire the water that would be impounded in the Upper San Rafael Reservoir from two sources. About 4,200 acre-feet would be purchased from private water users on the Upper and Lower San Rafael River and on Lower Cottonwood, Ferron, and Huntington Creeks. The remaining 30,800 acre-feet would come from a transfer of UP&L water rights from the Green River to the tributary San Rafael River.

Since the reservoir would be used only as an emergency supply, no water would be pumped from the reservoir during normal water years and all of the normal flow of the San Rafael River would continue downstream with the exception of 11 percent evaporative loss from the Upper San Rafael Reservoir (VHA, 1979). It is expected that a drough of sufficient magnitude would occur once in every 25 years which would necessiate the entire flow of the San Rafael River be impounded in the reservoir (VHA, 1979).

Description of the Existing Environment

Geology-Topography

Geology in the reservoir area consists of Mesozoic formations which weather to produce clay, silt, sand and sandy silts which are each more or less laden with soluble salts. The dam would be on the Curtis and underlying Entrada formations. The reservoir would inundate portions of the Summerville, Morrison (Salt Wash and Brushy Basin members), Cedar Mountain, and Dakota formations. In addition to those formations, the water supply pipeline would traverse the Tununk, Ferron, and Blue Gate members of the Mancos Formation.

Water Resources

With the Huntington plant and all four Emery units in operation, the average annual flow of the San Rafael River at the reservoir site would be 33,800 acre-feet. The average salinity of the water would be 3,150 mg/ℓ, but would vary from about 400 mg/ℓ during peak spring flow to over 8,000 mg/ℓ during low flows in the fall and winter. The average annual salt load carried by the river at the reservoir site would be 145,000 tons.

TABLE 8-9

Requirements for the Upper San Rafael Reservoir and Pipeline

	Reservoir	Pipeline		Access Road	
Ownership	Acres Occupied	Miles	Acres ROW	Miles	Acres ROW
Private	490	0.8	4.8	--	--
State	40	--	--	--	--
BLM	630	6.2	38.0	5.8	11.3
UP&L	0	0.7	4.2	--	--
Total	1,160	7.7	47.0	5.8	11.3

Vegetation

Vegetation types in the Upper San Rafael Reservoir site are the same as described for the Cottonwood Reservoir. Assuming the average width of the riparian zone to be 100 feet, approximately 130 acres of riparian vegetation are within the reservoir site. Approximately 85 miles of San Rafael River with about 1,030 acres of riparian vegetation are found between the dam site and the confluence of the San Rafael and Green Rivers.

Three proposed endangered species of plants, *Eriogonun lancifolum*, *Eriogonum corymbosum* var. *davidsei*, and *Townsendia aprica* could occur within the reservoir site or along the water supply pipeline.

Animal Life

Animal life is the same as described for the Cottonwood Reservoir site.

Cultural and Paleontological Resources

Twenty-one archaeological (18 prehistoric and 3 historic) sites are known to occur within the reservoir area. These are mainly lithic scatters of low significance. One historic site is of possible National Register quality (Hauck, 1979).

The Morrison and Cedar Mountain formations in the reservoir area and along the water supply pipeline are known to contain a variety of fossil materials.

The Morrison Formation contains dinosaur bones and stomach stones. The Cedar Mountain Formation contains petrified wood, leaf compressions and an abundance of a fossilized fern. The area could be of significance for further scientific study.

Scenic Resources

The Upper San Rafael Reservoir would be within the San Rafael River bottom in the back ground visual zone of an area of Class C scenery and medium sensitivity (See Appendix II-6 for definition of terms). Present man-made contrast as viewed from east to west is high due to the presence of Emery Units 1 and 2. The reservoir site is visible from the Cedar Mountain overlook.

The San Rafael River is visible from the Wedge Overlook.

Minerals

The mineral resources of the Upper San Rafael Reservoir would be as described for the Cottonwood Reservoir.

Land Uses

Agriculture and Livestock Grazing

The reservoir would inundate approximately 132 acres of irrigated cropland in the Cottonwood Drainages and approximately 1,028 acres of grazing land. The principal crop is alfalfa, but some small grains are grown. The annual yields for alfalfa is about 3 tons per acre and about 57 bushels of grain per year (Utah Bureau of Agricultural Statistic, 1978). The rangelands and riparian habitat within the reservoir site produce approximately 107 AUMs or enough forage to sustain about 18 cattle and calves for about 6 months.

The reservoir would take water by purchase from approximately 837 acres of cropland in the surrounding area and downstream. The cropland would then be retired from crop production and converted perhaps to grazing and rangeland.

It has not been determined whether the croplands in this area are prime, unique, or of statewide importance. For a definition of these, see Appendix II-7 farmland categories).

Recreation

The present recreational resources and uses are as described for the Cottonwood Reservoir.

Special Designation Areas

The reservoir would be located within BLM Roadless Inventory Unit 015, which has been inventoried for wilderness values. The inventory determined that the area lacks wilderness character and recommended that it be excluded from further wilderness review (IPP Accelerated Wilderness Inventory, May, 1979). The recommendation is presently undergoing public review. Until a decision is finalized in the fall of 1979, the unit must be managed to protect any suitability it may have for Wilderness Designation.

Wild and Scenic River potential is as described for the Cottonwood Reservoir.

Mining

A minimum of 34 mining claims (mainly uranium claims), held by two mining companies, and a Utah State mineral lease section (Section 16, T 19 S., R 9 E.) are totally or partially within the reservoir site. Sufficient assessment work to validate the claims was done during 1978. There are no active uranium mines nor any record of previously active mines on lands that would be inundated by the reservoir (Britt, 1979).

Land Use Plans and Controls

The applicable land use plans are as described for the Cottonwood Reservoir.

Human Resources

The present employment, population, and income in Emery County is described in the Human Resources section of Chapter 2.

The 837 acres of agricultural land that would be affected by the Upper San Rafael Reservoir are estimated to presently provide about eight jobs, based on 0.009 jobs per acre, and could produce about $125,400 of income per year (Wistison, 1979).

Environmental Impacts

Introduction

No mitigating measures other than the company proposed and standard federal requirements described in Chapter 1 have been identified for the adverse impacts discussed in this section. Therefore, all adverse impacts described below are considered unavoidable.

Water Resources

During the initial impoundment phase of the reservoir (approximately 2 to 4 years) and during extreme drought years (about one in every 25 years) the annual flow of the San Rafael River could be reduced by as much as 100 percent directly below the dam site. Below the dam the river would flow only during periods of runoff after storms. Because of inflow into the river, the average annual flow of the San Rafael River increases about 6 percent or 2,120 acre-feet between the dam site and the Green River. Regardless of the proposal, this amount would continue to flow into the Green River (VHA, 1979).

The volume of the Green River below its confluence with the San Rafael would be reduced by less than 1 percent.

Increased evaporation following impoundment and during normal water years would cause the flow of the San Rafael River to be reduced by about 11 percent.

During normal water years, the average salinity of the water in the San Rafael River at and directly below the dam site would increase from 3,150 mg/ℓ to approximately 3,550 mg/ℓ. However, the salinity of the water would be stabilized and would not vary as it does without the reservoir (extremes of 400 to 8,000 p/m). A smaller quantity of water with a higher salt concentration would carry about the same total salt load into the Green River as would be carried without the reservoir.

During drought years salt laden water would be pumped out of the river system and used at the plant site. The total salt load carried into the Green and Colorado Rivers would decrease during those years.

Vegetation

The reservoir would cover about 1,160 acres. About 11 percent of the acreage is riparian vegetation, 11 percent is agricultural land, and 78 percent is desert salt shrub. The water supply pipeline and access road would temporarily disturb about 58 acres of salt desert shrub. The total affected salt desert shrub is only an extremely small amount of that available. The inundated riparian vegetation represents about 11 percent of the riparian vegetation between the northern end of the reservoir site and the confluence of the Green and San Rafael Rivers. The riparian vegetation below the dam may increase in density and vigor as the salinity of the river would be stabilized at about 3,550 p/m rather than reaching up to 8,000 p/m.

Little research has been done on salt tolerant natural riparian vegetation, but according to (Oka, et.al., USBR, 1979) natural vegetation probably would respond much like agriculture acreage, i.e., germination is affected in plants with salt concentrations greater than 700 p/m but plants are unaffected in growth up to 5,000 p/m. The riparian species along the San Rafael River reproduce and spread by suckering and sprouting so that predicted increases in salinity would have little affect on existing riparian vegetation downstream of the dam.

During the years when the bulk of the river flow would be impounded, flow from runoff and side drainages (up to 2,120 acre-feet) would be sufficient to support the existing riparian vegetation which is adapted to alternating wet and dry periods.

Impacts to threatened or endangered plant species which occur in the area, _Eriogonum lancifolium_, _Eriogonum corymbosum_ var. _davidsei_, and _Townsendia aprica_ cannot be fully analyzed at this time because their distribution and response to soil and water salinity is for the most part unknown. None of these plants are located in the riparian zone, nor are they endemic to or restricted to any of the drainages that would be affected by the reservoir. Therefore, the continued existence of any of these species would not likely be jeopardized nor their critical habitat adversely modified.

Animal Life

Aquatic

During the impoundment and drought years the populations of rough fish in the San Rafael River would likely decrease below present levels. However, the fish species in the river have historically survived drought periods when the flow of the river has been extremely low and would likely survive through the low flow years. The new reservoir would provide additional habitat for the rough fish in the river as they can tolerate up to 15,000 p/m (EPA, 1976) of total dissolved solids (TDS) and the reservoir water would contain only 3,550 p/m. Game fish can tolerate up to only about 1,500 p/m of TDS and the reservoir would not provide a fishery (Livesay, 1979).

Terrestrial

Less than 0.001 percent of the desert habitat for mule deer, cottontail and jackrabbits would be inundated. This would have no measurable effect on populations of these animals. However, the loss of about 11 percent of the riparian vegetation and mature cottonwoods along the San Rafael River desert area between the north end of the reservoir site and the confluence of the San Rafael and Green Rivers could reduce the populations of owls and other tree nesting birds as well as other forms of wildlife which are dependent upon the riparian zone.

The reservoir would provide 1,600 additional acres of waterfowl feeding and resting area in Emery County which is extremely arid and presently has only about 2,600 acres of waterfowl habitat (Jensen, 1974).

Wild and Free Roaming Horses and Burros

Wild horses and burros are not found in the vicinity of the reservoir or pipeline.

Endangered Wildlife

Since no active peregrine eyries, identified bald eagle roosting site, or populations of black-footed ferrets are known to occur on the reservoir site, or along the water supply pipeline, the continued existence of these species is not likely to be jeopardized or their critical habitat adversely modified by construction of the Upper San Rafael Reservoir.

Formal consultation with the U.S. Fish and Wildlife Service on the effects of the reservoir and pipeline on endangered species has been initiated.

Cultural and Paleontological Resources

Major impacts to archaeological and paleontological resources would be prevented by implementation of Standard Requirements described in Chapter 1.

Development would provide access to archaeological sites and to paleontologically sensitive areas in the Morrison Formation and would result in partial destruction of total loss of scientific information. The amount and significance of loss cannot be accurately predicted.

There would be partial destruction of scientific information having value for recreational, educational, and interpretative purposes. Damage could occur through ground disturbance during construction, to values not initially discovered through field inventories. Even if salvage is performed, an unknown amount of scientific evidence would be lost due to limited techniques.

Scenic Resources

The dam and reservoir would be visible (low contrast) from the Cedar Mountain Overlook. The reservoir would add variety to the landscape, and would improve aesthetic values to some people and would reduce aesthetic values to others.

Any loss of water in the San Rafael River would result in a decrease in the aesthetic value of the area as viewed from the Wedge Overlook, especially if the stream were completely dewatered during reservoir filling or during dry years.

Land Uses

Agriculture and Livestock Grazing

About 132 acres of agricultural land would be inundated by the reservoir and an additional 705 acres would be removed from production due to conversion of irrigation water to industrial use. The land removed from production represents about 2 percent of the cropland in Emery County (Utah Bureau of Agricultural Statistics, 1978).

In 1977 cropland in Emery produced about 57 bushels of oats or 3 tons of alfalfa per acre (Bureau of Agricultural Statistics, 1978). Based on 1977 figures, the cropland that would be lost would produce about 47,709 bushels of oats or 2,511 tons of alfalfa annually. This would be equivalent to 83 and 7 percent respectively of the Emery County production of these products in 1977 (UBAS, 1978). The actual portion of the 837 affected acres that have been in production since 1975 is unknown.

Change in land use as a result of converting water from agricultral to industrial use could impair the ability of ranch property to support livestock while they are not on federal property.

Approximately 107 AUMs of forage would be inundated on the Red Seaps and Hambrick Bottoms BLM grazing allotments. However, conversion of 705 acres of irrigated land to grazing could result in an additional 141 AUMs for grazing use of private land.

Recreation

Storage and removal of water from Cottonwood, Ferron, and Huntington creeks would reduce water flow in the San Rafael River during the high flow spring months when recreational use is at its peak. Less water in the San Rafael River during spring months would reduce the length and quality of floatboating and water play opportunities and there would be an unquantified reduction in visitor days provided by this segment of the river.

Sufficient recreation sites are already available in the area, and it is unlikely that federal, state, or local government agencies would have sufficient funds to develop and manage for the recreational potential of the reservoir. However, the reservoir would provide opportunities for sailboating, motorboating, and waterfowl hunting.

Special Designation Areas

Construction of a reservoir and creation of a lake would impair any suitability Roadless Inventory Unit 015 may have for Congressional Wilderness Designation. Construction would not be allowed prior to completion of wilderness review for the unit.

Storage and removal of water from Cottonwood, Huntington, and Ferron Creeks would reduce water flow in the San Rafael River, reducing or eliminating its potential for Wild and Scenic River designation.

Mining

The option to extract minerals (mainly uranium) from all or part of 34 mining claims and a portion of a Utah State mineral lease section would be lost due to inundation by water. The true value and significance of these claims has not been identified, but no active or previously active mines would be affected. Prior to inundation, a validity determination on existing claims would have to be made. Should claims prove to be valid, some compensation would have to be made to the claimants.

Land Use Plans and Controls

The BLM San Rafael Planning Area MFP recommends the San Rafael River for study as a wild and scenic river. Reduction of waterflow could reduce the potential of the river for Wild and Scenic River Designation which would conflict with this recommendation.

No other conflicts with the BLM, state, or local land use plans for the San Rafael area have been identified.

Human Resources

Employment/Population/Income

Table 8-10 contains projections of direct and indirect employment for 1983 and 1984 for the upper San Rafael Reservoir dam and pipeline.

The average annual incremental population related to the construction of the alternative reservoir and pipeline is 25 in 1983 and 80 in 1984. These projections of population are based on the assumption that many of those employed would not be residents of Carbon or Emery counties and would not bring their families because of the temporary and seasonal nature of the job.

Total earnings (wages and salaries, other labor income, plus proprietors income) is projected to be $202,000 in 1983 and $660,000 in 1984.

As shown in Table 8-11, it is estimated that the average annual reduction in agriculture employment would be eight people. The estimate of the reduction of agricultural employment is a maximum estimate based upon one job for every 100 acres for the 837 acres of cropland that would be retired.

It is estimated that the value of agricultural production lost due to construction of the Cottonwood Reservoir would be about $125,400. These estimates are based on the assumptions that the land involved produces 3 tons of hay per acre and the value of this hay is assumed to be $50 per ton.

Quality of Life

Compensation would be given to the 11 owners whose water rights and land are sold to Utah Power and Light in order to construct the reservoir. There

TABLE 8-10

Average Annual Incremental Direct and Indirect Employment, Population, and Income Related to Construction of Alternative Reservoirs and Pipelines

	San Rafael Reservoir 1983	San Rafael Reservoir 1984
Employment		
Direct[a]	8	26
Indirect	3	10
Total	11	36
Population (maximum)	25	80
Earnings (1975 $)[b]	$202,000	$660,000

[a] Based on preliminary engineering estimates.

[b] Wages and salaries, other labor income plus proprietors income by place of work.

TABLE 8-11

Reduction in Agricultural Employment Related to Construction of Alternative Reservoirs

San Rafael Reservoir	Average Annual Employment (Maximum)
Lower San Rafael Area	5
Upper San Rafael Area	3
Total	8

Source: Based on acreage given in Table 8-9.

would be significant changes in family lifestyles if the land retired is used for the sole livelihood of those affected. Some of the acreage is small and the landowner may have to get supplemental employment to sustain the family. Others may required retraining for new employment.

There appears to be no significant impact on the quality of life of the residents in the non-agricultural sectors of the economy.

ALTERNATIVE COAL HANDLING AND LOADOUT FACILITY

The alternative facility would be located on approximately 36 acres of public land. The site location and facilities are shown in Figure 8-12. Should this site be approved, the alignment of the last mile of conveyor and utility lines, as shown in Chapter 1, would be changed. The right-of-way needs for these facilities would remain approximately the same as shown in Chapter 1.

In addition, a right-of-way for 36.33 acres of public land administered by the Bureau of Land Management would be needed for the loadout facility. Also a 0.76 mile right-of-way, 50-foot wide, would be needed for a 24 foot wide two-lane paved road. A separate 400-foot by 400-foot right-of-way (3.67 acres) for the absorption drain field would be required adjacent to the load out facility.

All impacts identified for the proposal would apply to this alternative except that the site would be located farther back from U-29 and have a lesser adverse impact to the aesthetic resource in Cottonwood Canyon. Occupancy of the site would result in the loss of about 2 AUMs of livestock forage which is less than 4 percent of the capacity of the grazing allotment involved.

ALTERNATIVE MINE PORTAL SITE

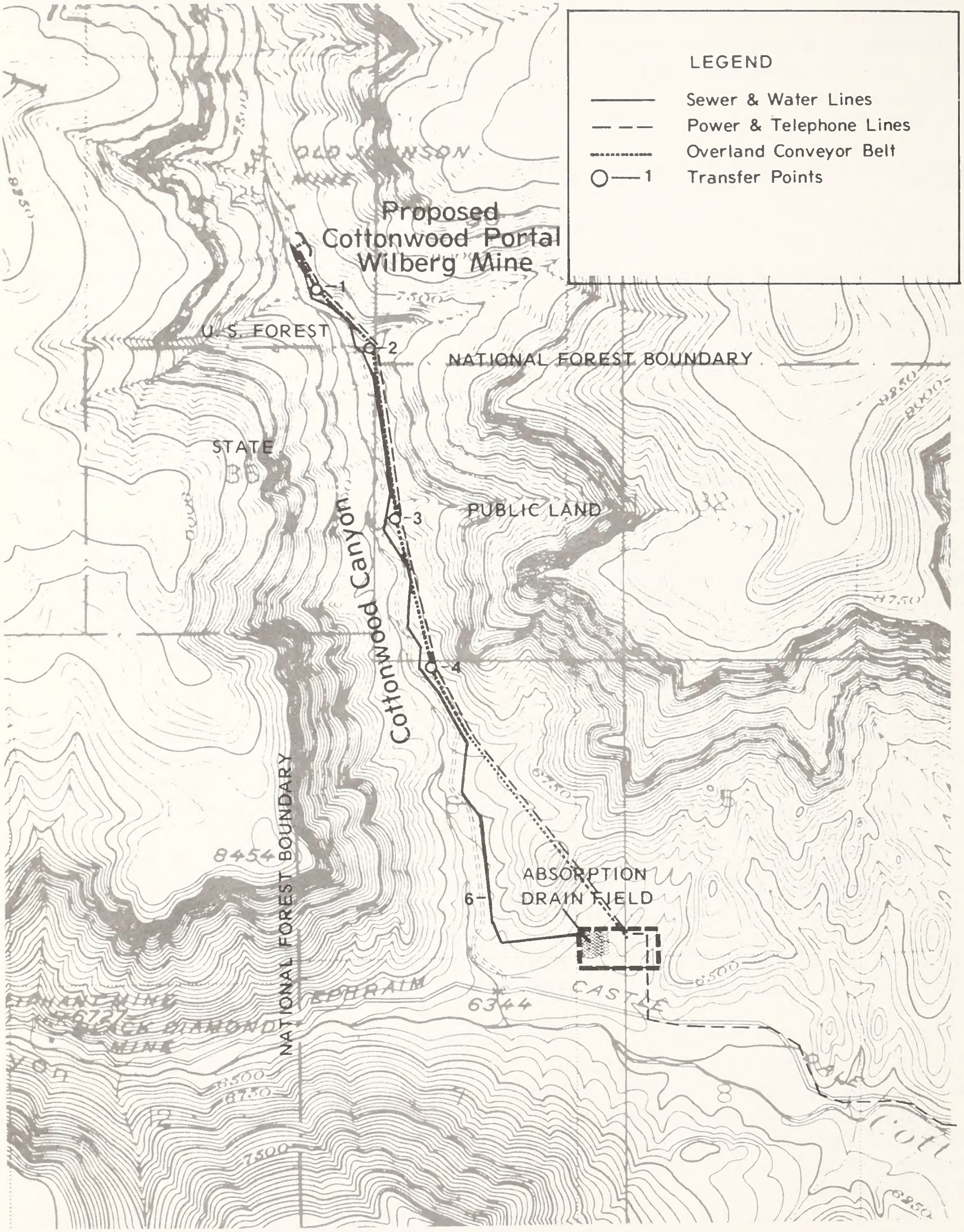
Concern has been expressed that the Cottonwood Mine Portal would create traffic congestion in Cottonwood Canyon. As a result, an alternative mine portal site is being evaluated down canyon from the portal. The most logical site shown on Figure 8-13, is in an unnamed canyon about 0.5 miles south of the Cottonwood Portal.

The alternate portal facility would occupy about 10 acres of Forest Service land. In addition to the facilities shown on Figure 1-10, a 200-foot high manlift facility would be required to reach the coal seam above the parking and office facilities. The required road, conveyor, and utility rights-of-way would be about 0.25 miles shorter than with the Cottonwood Portal. About 65 acres would be required for the rights-of-way as shown on Table 8-12.

The existing environment at the alternate mine portal would be essentially as described for the Cottonwood Portal with the exception that a stream and riparian vegetation are not present at the alternate site.

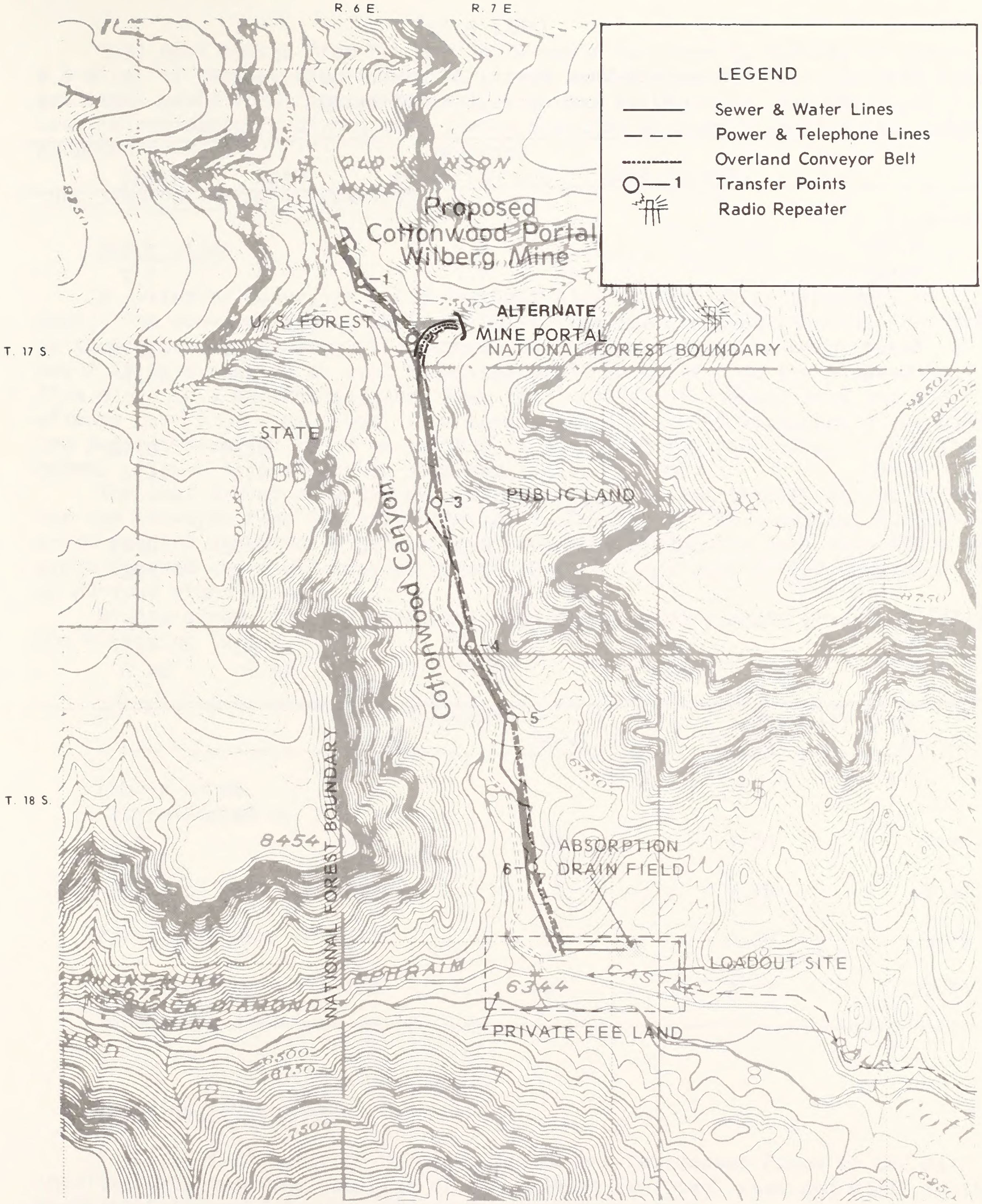
Destruction of approximately 2/3 acre of riparian vegetation would be avoided by implementation of the alternative mine portal. This site would preserve the option for future upgrading of the road and not constrain future use of the canyon.

The impacts on all other resources would be essentially the same as with the proposed action. The number of vehicles operating in the immediate vicinity of the Bell Mine would be reduced, but the average daily traffic on the paved road about 0.5 miles down Cottonwood Canyon would be the same with either the Cottonwood or alternate portal.



ALTERNATIVE COAL LOADOUT SITE

FIGURE 8-12



COTTONWOOD COAL CONVEYOR AND UTILITY SYSTEM

FIGURE 8-13

TABLE 8-12

Alternate Mine Portal Site and Facilities Miles and Acreage Requirements

	Portal Site	Conveyor and Utilities	Road	Total
Private				
Miles		0.1	0	0.1
Acres		1.7	0	1.7
BLM				
Miles		1.90	1.88	3.78
Acres		32.2	11.4	43.6
USFS				
Miles	--	0.20	0.20	0.40
Acres	10	3.4	1.2	14.6
State				
Miles		0.17	0.32	0.49
Acres		2.9	1.9	4.8
Total				
Miles		2.37	2.40	4.77
Acres	10	40.2	14.5	64.7

Coal haul trucks from the Bell Mine would continue to operate on about 0.5 miles of narrow, single lane dirt road between the mine and the Utah Power and Light paved road. Until the existing road is upgraded, the hazard of traffic accidents involving coal trucks would be greater than with the company's proposed road.

COAL TRANSPORTATION ALTERNATIVE

Description

A system of conveyors could substantially replace truck transport of coal. The conveyor system would be built from the proposed load-out facility, at the Cottonwood Canyon--Straight Canyon confluence, to the plant site. A new 2.27-mile section of coal haul road would be built from the Deseret-Beehive Mines to a marshalling area near the junction of Highway U-29 and the Wilberg coal haul road. Coal from three mine portals (Cottonwood, Wilberg, and Deseret-Beehive) could be carried to the plant via the conveyor from that point. Figure 8-14 shows the proposed route.

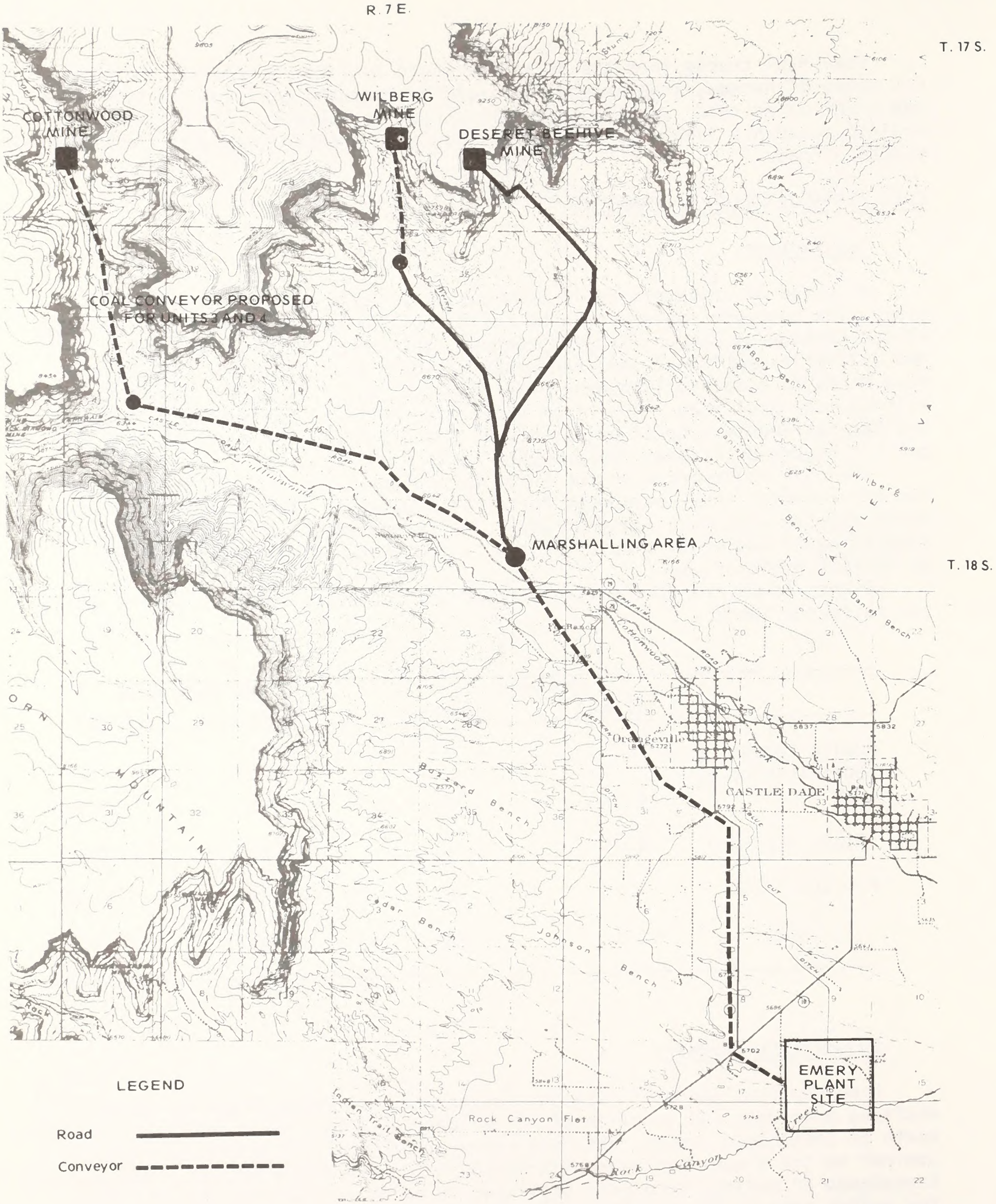
The coal conveyors would be built according to the specifications described for the conveyor from Cottonwood Portal in Chapter 1. This system, however, would require a 60-foot right-of-way. The Deseret-Beehive coal road would be asphalt paved and would consist of two 12 foot lanes with 4-foot shoulders in an 80-foot right-of-way.

Rights-of-way for the coal haul road and conveyors would cross and occupy the following lands:

	Conveyer		New Haul Road	
	Miles	Acres	Miles	Acres
Public Lands administered by BLM	4.5	33	1.28	12.41
State of Utah	0.0	0	0.60	5.82
Private lands	7.5	55	0.39	3.78
Total	12.0	88	2.27	22.01

Existing Environment

From the confluence of Straight Canyon and Cottonwood Creek to the marshalling area near the junction of the Wilberg coal haul road and U-29, in the mouth of Cottonwood Canyon, the coal conveyor would traverse mainly pinyon-juniper on the slopes and sagebrush-saltbush in the canyon bottoms. No possibly threatened or endangered plants are known to exist in the area (Welsh, 1978). The entire area is an essential wintering area for deer. Up to 400 deer have been observed wintering in this canyon (UDWR, 1978). Cottonwood Creek is a year-long water source for deer on the south slopes of East Mountain.



ALTERNATIVE COAL LOADOUT SITE

FIGURE 8-14

No archaeological sites are known to exist along the proposed coal haul road or conveyor routes (Sisson and Barnett, 1978).

The conveyor would cross U-29 south of the marshalling area. U-29 is an important recreational access highway to Joes Valley. It is traveled by 190 vehicles daily. The conveyor would cross U-10 near the plant site. U-10 is traveled by 820 vehicles daily.

Environmental Impacts

Disturbance would drive deer from essential wintering areas. Deer losses due to displacement and stress could be expected. The extent of deer loss through disturbance cannot be determined. Daily movements of deer for water would be blocked or disrupted by the conveyor. Seasonal deer migrations to wintering areas on the south side of the conveyor would also be disrupted. Although some elevated areas may serve as deer crossings, little is known about deer use of such crossings.

The coal conveyor would establish high contrast in Cottonwood Canyon as viewed from U-29 and could be seen from along 7 miles of U-10. This visual intrusion would be viewed daily by people in 190 vehicles on U-29 and 820 vehicles daily on U-10. Transport of coal by conveyor would mean about 686 fewer trucks per day traveling the area's highways.

Mitigating Measures Unique to This Alternative and Required by Federal Agencies

To minimize disturbance to wintering deer, conveyor construction would be halted on public land between November 1 and April 30 in essential deer winter range from the confluence of Straight Canyon and Cottonwood Creek to the marshalling area. Prior to construction, a wildlife biologist, or other person approved by the appropriate federal official, would be consulted and the conveyor system designed to assure that proper provisions are made for passage of wildlife.

Unavoidable Adverse Impacts

Deer movements for water and to wintering areas would be disrupted and impaired by the conveyance systems. Habitats presently being occupied could be permanently lost to some deer and overall deer numbers reduced. Although deer have been observed to utilize conveyor crossings, the extent of their usage is unknown.

The conveyor would still interrupt the landscape's natural character and would be noticeable. This feature would be seen along Highway U-29 and Highway U-10.

OTHER ALTERNATIVES

Delay

A 1 year delay in constructing Units 3 and 4 would result in a loss of reserve margin for the power company (Utah Power and Light Company, 1978). Reserve margin is that amount of spare generating capability which can be put into service during normal maintenance shutdowns, the loss of a line from a generating source, or the loss of a generating unit. Utah Power and Light Company currently operates under a reserve margin of 20 percent of the firm peak load. The reserve margins from a 1 year delay would be:

	1983	1984	1985
Estimated Firm Peak Load	2,973	3,199	3,444
Estimated Reduction from Load Management	153	168	182
Total Needs	2,820	3,031	3,262
Imports or Exports	0	0	0
Total Resources	2,968	3,368	3,368
Reserve Margin (MW)	148	337	106
Percent of Firm Peak Load (reserve margin)	5.0	10.0	3.1

Source: Utah Power and Light Co., 1978.

A delay in Units 3 and 4 operation would mean that electricity would be purchased from other companies during normal maintenance shut downs or contingencies. In all probability UP&L would also accelerate the construction of Units 4 and 5 at Naughton, near Kemmerer, Wyoming, which are now scheduled to go into service in 1987 and 1988. By accelerating construction, these units could be brought on line 1 or 2 years earlier to partially replace the power which would have been supplied by Units 3 and 4. An environmental analysis is currently being prepared by the BLM in Wyoming in connection with a Draft Environmental Statement for the Development of Coal Resources in Southwestern Wyoming to disclose impacts from the construction and operation of Units 4 and 5 at Naughton.

No Action

The effects of no action would be similar to those of delay. Reserve margins would be reduced or eliminated. The following shows the reserve margin that could be expected should the units not be built.

	1983	1984	1985
Estimated Firm Peak Load	2,973	3,199	3,444
Estimated Reduction from Load Management	153	168	182
Total Needs	2,820	3,031	3,262
Imports or Exports	0	0	0
Total Resources	2,968	2,968	2,968
Reserve Margin (MW)	148	-231	-476
Percent of Firm Peak Load (reserve margin)	5.0	-7.6	-14.6

Source: Utah Power and Light Co., 1978.

The company would need to purchase power from other companies, not only during maintenance operations or contingencies, but for firm peak load.

In all probability, the no action alternative would mean that an accelerated construction program would occur at Naughton on Units 4 and 5 as discussed under delay.

If the no action alternative were chosen, water that would have been required for the plant could continue to be used to irrigate crop lands. In addition, the water could be used for alternative energy sources, such as coal gasification or oil shale development. No plans for these alternative uses are currently known and their impacts have not been analyzed.

In the same respect, if the coal were not devoted to Emery it could be used by other generating units, for coal gasification, petro-chemicals, or held in reserve for some future use. If the coal were held in reserve, there would be no change in the existing environment at the mine location. No known plans exist for other specific alternatives, therefore impacts are unknown under no action.

All unavoidable impacts described in Chapter 5 (to air quality, vegetation, animal life, minerals, land, cultural, water, scenic, and human resources) would be eliminated by use of the no action alternative.

Plant Design and Operating Methods

Alternative Particulate Removal System

Industry uses many kinds of particulate removal systems, but most of them lack the efficiency necessary to remove 99 percent of the particulates in the stack gases. Two methods which have demonstrated ability to remove particulates with high efficiencies are electrostatic precipitators and baghouses. Electrostatic precipitators are proposed for Units 3 and 4. A comparision of removal efficiencies versus particle size for various kinds of particle-removal systems is shown in Figure 8-15.

Baghouses

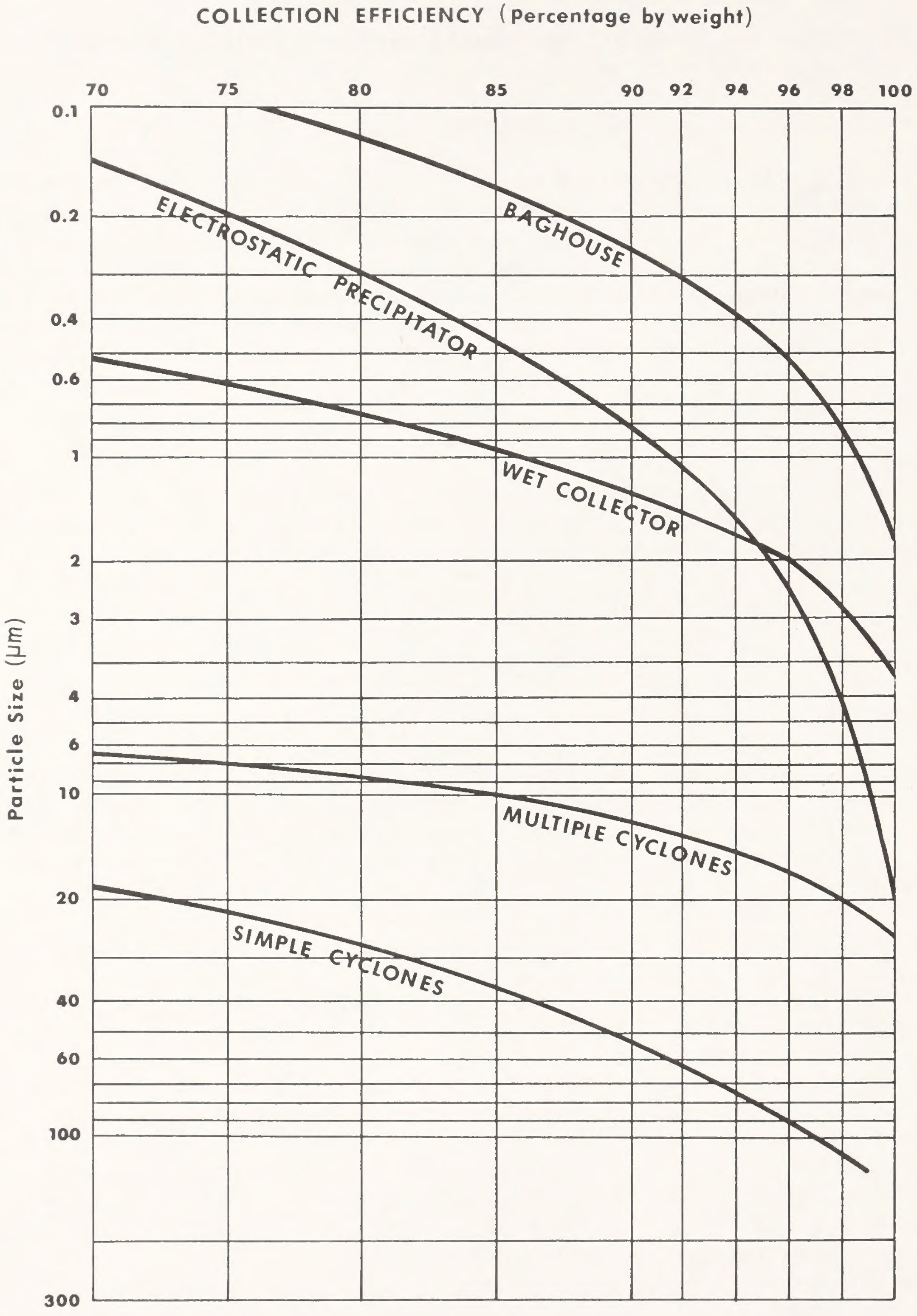
One of the oldest and most positive methods for removing solid particulate contaminants from gas streams is by filtration through a fabric medium.

Baghouses are simply porous-fabric filter bags housed in a large structure. When dust-laden gases pass through these filters, particulate matter is collected by the bag fabric and then removed by a dust-dislodging step. The use of a baghouse can remove all particulate matter over 2 micrometers (μm) in size. It is also capable of providing a higher collection efficiency for particulates as small as 0.5 μm, and will remove a substantial quantity of particulates as small as 0.01 μm (EPA, 1972a). These smaller particulates have been identified as causing respiratory problems.

The total particulate removal capability of a baghouse can be expected to exceed 99.5 percent.

Major advantages of the filtration system are that filters can be operated under a wide range of operating conditions; maintenance can be performed during operation without disturbing filtration efficiency; and there is high collective efficiency for sub-micrometer particulates.

Disadvantages are that baghouses cause a moderate pressure drop between inlet and outlet gas streams. While highly efficient at a smaller scale, baghouses have not been evaluated for efficiency at a scale needed for Units 3 and 4.



Source: EPA

SIZE EFFICIENCY CURVES FOR PARTICULATE CONTROL EQUIPMENT

FIGURE 8-15

Baghouses would result in impacts similar to those described in Chapter Three for an electrostatic precipitators.

Alternative Cooling Systems

In order for the turbine steam to be reused, it must be condensed into water. Condensation is accomplished by transferring heat from the steam to a circulating water system. Heat transferred from the steam to the circulating water is then dissipated through the use of a cooling system.

The Company proposes to use wet, mechanical-draft cooling towers for Units 3 and 4. Other types of cooling systems are available, although they would have different environmental impacts.

Dry Cooling Towers

Dry cooling towers use air to dissipate heat from the power plant to the surrounding atmosphere. The cooling is accomplished by drawing air past tubes and fins containing the heated water, similar to an automobile radiator. The air never directly contacts the circulating water.

Dry towers could result in saving as much as 7,000 acre-feet of water annually (USDI, 1977). Dry cooling would eliminate problems of fogging, icing, drift, and plume visibility.

Turbine cycle thermal efficiency using dry cooling towers is estimated to be 4 to 10 percent poorer than a conventionally-cooled turbine cycle. Thus, a plant having a dry cooling tower would require up to 10 percent more fuel (an additional 240,000 tons of coal annually for Units 3 and 4).

For a dry cooling tower application, the turbine must be capable of operating at higher peak pressures, approximately 10 to 14 inches of mercury absolute, and at a much wider variation of back pressures. Suitable turbine generators are not currently in production in the United States.

The Office of Energy Research has established a program to determine the feasibility of dry and wet-dry cooling tower applications in the United States, utilizing a long-term testing program at the 330-MW Wyodak Station in Wyoming. Results from the program will not be available until 1982.

Wet-Dry Cooling Towers

This type of tower is merely a combination of a wet type tower and a dry type tower. This combination allows for advantages of both types--evaporative cooling efficiency during warm weather and conservation of water in cool weather. The use of wet-dry cooling towers could result in the savings of as much as 2,200 acre-feet of water (USDI, 1977).

Cooling Ponds

Cooling ponds are open bodies of water to which heated water is added at one end, and from which cooled water is removed at the other. The ponds use the natural heat exchange processes of evaporation, radiation, and conduction-convection to dissipate the waste-heat load from the power plant.

Ponds do not produce "drift" (droplets of mist) as do wet cooling towers, and avoid the environmental effects of drift on soil and vegetation. Also, until water quality becomes poor (estimated to be 20 years after operation), the edges of cooling ponds would be excellent habitat for small animals, and the ponds, would provide temporary stop-over points for migrating waterfowl.

The construction of a cooling pond would require 1,700 acres of land. A probable location for a pond at the Emery site has not been determined, but terrestrial wildlife and vegetation would be displaced or eliminated over at least that much area. This acreage would remain occupied by the cooling pond for the life of the project. This impact would be of a local significance only.

An additional 6,500 acre-feet of water would be required annually if cooling ponds were used instead of the proposed wet system (USDI, 1976). This could retire up to an additional 1,625 acres of irrigated land (about 4 percent of irrigated crop lands in Emery County). This impact would be of local significance, only Emery County being involved. The duration would be for the project's life. Loss of vegetative production on irrigated crop land would be an unavoidable adverse impact.

Mining Techniques

Investigations of various mining techniques indicates that conventional, continuous, longwall, and shortwall all have very similar beneficial and adverse environmental effects. The differences in techniques mainly apply to company options of economy, convience, and safety (USGS, 1978).

Other Energy Sources

This section discusses alternative energy sources to those of direct combustion of coal, oil, natural gas, and hydroelectric for power generation in the areas served by Utah Power and Light Company (UP&L). A complete discussion of alternative energy sources can be found in "Energy Alternatives: A Comparative Analysis" prepared for the Council on Environmental Quality by the University of Oklahoma, 1975.

Fossil Fuels

Coal Gasification

Combined-cycle power plants, using coal gasification and liquefaction to supply a clean fuel from coal, are possible competitors with fluidized-bed combustion and stack-gas cleaning in the utilization of coal in an environmentally acceptable manner. Commercially available gasification systems such as Lurgi, Koppers-Totzek, Wellman-Glusha, and Winkler have efficiencies of 60 to 65 percent and high costs. Work is being done on a 170 megawatt combined-cycle gas-turbine/steam-turbine power plant in Germany. Technology developed there and research in this country should provide the possiblity of using this system in the late 1980s.

Tar Sands

Utah has 95 percent of the U.S. tar sands with a reserve of 20 to 25 million barrels of oil (Utah Geological and Minerial Survey, 1973). The cost of oil from the tar sands will be higher than the present crude oil prices, and this together with higher uses of petroleum is economically prohibiting the use of oil from tar sands in electrical power generation.

Oil Shale

About 90 percent of the nation's oil shale reserves are in the states of Colorado, Wyoming, and Utah (USDI, 1976). Technology has not yet been developed to the point where oil shale can be used for electric power generation. Furthermore, when it is developed, the cost will be much higher than present petroleum products and it is not expected to be used for electrical power generation. Some gas by-products from the development of oil shale might be used in gas turbines. This will have to be investigated as the oil shale is developed.

Nuclear

Utah Power and Light does not presently use nuclear power plants. Utah Power and Light estimates that it would require 12 to 14 years to bring a nuclear power plant into operation. Nuclear power plants, in Utah, are not considered economically competitive with mine-mouth, coal-fired generating units. It is expected, however, that nuclear power will be competitive by the 1990s. Uranium exploration activities are underway in Utah to provide uranium resources for nuclear power plants in that time frame. A study by the federal government is underway to determine the feasibility of a 10,000 to 13,000 MW nuclear power generating complex near Green River, Utah.

Solar

Solar water heating is close to being competitive with electric water heating in Utah. Reliable solar space-heat systems are available on a limited basis, but cost approximately $10,000 to 14,000 for the average 1,500 square foot home (UP&L, 1978). It is expected that lower costs and more reliable equipment can be developed in the next decade. This could provide up to approximately 20 percent of the new heating market by the year 2000.

The nation's first large solar electric generating plant is being designed by the Department of Energy and Southern California Edison for operation in the early 1980s. This will be a 10 megawatt unit and larger units will probably not be developed until just before the end of the century. Large areas of land are required for facilities of this type.

Solar cells for direct conversion of solar energy to electricity cost about $15 per watt. It is expected that technology for lower-cost solar cells could be developed within a decade which could lead to the direct generation of small amounts of electricity from the sun (NPS, 1977).

Hydroelectric

Five percent of the electrical power generated by UP&L comes from hydroelectric sources. It has been estimated that the proportion generated nationally could be increased by 50 percent of its current level (Center for Strategic and International Studies, 1976). This would also be true for the area served by UP&L. The additional hydroelectric generation would require the use of scenic areas, such as the Grand Canyon on the Colorado River or Greys Canyon on the Green River.

Low-head hydroelectric generation (a water "drop" of less than 60 feet) and European bulb-turbine equipment is being investigated. These investigations include economic, siting, and technology reviews and it is not expected that this technology can contribute significantly in the time frame of the middle 1980s (UP&L, 1978).

Wind Power

The generation of electricity using wind is feasible. Utah's valleys, however, are among the lowest average wind areas in the nation (Salt Lake Valley Energy and Minerals Recovery System, 1978). The surrounding mountains, however, have higher wind speeds, but present conflicts with communication interference and environmental problems with transmission lines to the mountain peaks. The technology for large windmills would require advancement in aerodynamics, since blades required for wind mills would be larger than the largest aircraft wings being produced today. Therefore, a break-through in technology would be required to produce significant amounts of energy.

Geothermal

Geothermal energy is a potential supplemental source of energy. Only one possible commercial field in Utah, the Roosevelt Hot Springs Unit near Milford, is currently being developed. It is estimated by Phillips Petroleum Company and the University of Utah Department of Geology and Geophysical Sciences that this resource might contribute a total of 300 megawatts. The first 52 megawatt power plant could be built by June, 1982. Growth would be determined by the development of the steam field and would probably allow additional 52 megawatt units to be added in 2-year increments until the 300 megawatt capacity is reached.

CHAPTER 9

CONSULTATION AND COORDINATION

CHAPTER 9
CONSULTATION AND COORDINATION

INTRODUCTION

This chapter discusses the consultation and coordination conducted in preparation of the environmental statement (ES). Items discussed include: a brief synopsis of the development of the statement; organization of the interagency team; federal, state, local and public contacts; adherence to mandatory federal law; and significant meetings held. Organizations that received a copy of the draft statement and were requested to submit written comments are listed.

HISTORY OF CONSULTATION AND COORDINATION

On April 18, 1977, a meeting was held involving Utah Power and Light (UP&L) officials and representatives of the Bureau of Land Management (BLM). During the meeting, UP&L officials requested that BLM prepare an ES for Units 3 and 4 of the Emery Power Plant. On September 30, 1977, Utah Power and Light submitted preliminary data for the proposal. On January 16, 1978, the Utah State Director, BLM, requested that the Director, BLM, approve the preparation of the ES. On February 10, 1978, pursuant to a memo from the Director, the Richfield District was assigned the task of preparing the statement. On Feburary 27, 1978, UP&L made a final proposal submission. Utah Power and Light contracted with Vaughn Hansen Associates of Salt Lake City to provide necessary environmental base line data. Vaughn Hansen Associates submitted all reports simultaneously to BLM and UP&L.

Subsequently, the BLM requested formal assistance from the USFS, Utah Division of Wildlife Resources (UDWR), USGS, USBR, and the National Park Service (NPS). The USFS, UDWR, and USGS each provided one individual to the interagency team. The USBR agreed to provide one individual for consultation and review, and the NPS indicated that effects on parks were expected to be small and they were interested in reviewing the Draft and Final ES only.

PRE-ASSESSMENT ACTIVITIES

In order to give guidance to the interdisciplinary team on significant environmental issues and geographic areas of concern and to provide continuing coordination and liaison, a pre-assessment team was organized from agencies which had responsibility to take official actions or were intimately involved with the preparation of the statement. The following persons (or their representative) participated on the pre-assessment team:

Bureau of Land Management
    District Manager--Richfield
    Environmental Project Manager--Richfield
    Area Manager--Sevier River Resource Area
    Area Manager--House Range Resource Area
    District Manager--Moab
    Area Manager--San Rafael Resource Area
    Area Manager--Price River Resource Area
    Area Manager--Wasatch Resource Area
    Division of Resources--Utah State Office

U.S. Forest Service
- Forest Supervisor--Uinta National Forest
- District Ranger--Spanish Fork Ranger District
- Forest Supervisor--Manti-LaSal National Forest
- District Ranger--Price Ranger District
- District Ranger--Ferron Ranger District
- Forest Supervisor--Dixie National Forest
- Forest Supervisor--Fishlake National Forest
- Energy Coordinator--Regional Office--Region 4

U.S. Geological Survey
- Conservation Division--Office of the Salt Lake Area Mining Supervisor

U.S. Bureau of Reclamation
- Water Division--Provo Office

In addition, the Cedar City District Manager and Escalante Area Manager were asked to participate, but declined.

Meetings were held in Provo and Salt Lake City with the pre-assessment team on February 13 and 14, March 28, and May 2, 1978. It was determined at the May meeting that future meetings would not be held as the team had completed its mission. All pre-assessment team members reviewed the Preliminary Draft Environmental Statement before it was submitted to Washington for final review.

ORGANIZATION OF THE INTERAGENCY TEAM

In February, 1978, an interagency, interdisciplinary ES team was organized under the leadership of a team leader in the Richfield District Office, Richfield, Utah.

The team personnel represented broad catagories of environmental expertise including air quality, soils, vegetation, wildlife, socioeconomics, scenic and recreational resources, geology and mining, land use, and cultural resources. All members used an interdisciplinary team approach in their analyses and writing activities during preparation of the statement. The team totaled 11 persons.

FIELD TRIPS

In order for the interdisciplinary team to become familiar with the geographic area of concern and meet with local officials on issues, the team toured the proposal on February 23 and 24, 1978. One day was spent studying the proposal from the air, by helicopter. Local UP&L, USFS, and BLM personnel were present. On April 18, 19, 20, and 21, 1978, a field trip was conducted to all alternative sites. Likewise, UP&L officials, as well as local BLM and USFS personnel were present. During the trip to Soda Springs, local contacts were made with the Forest Service, Idaho Fish and Game, and Caribou County. On April 27, 1978, a tour was conducted to Escalante, Utah to look at the railroad and Kaiparowits coal field. Local BLM officials accompanied the team on the trip.

INTERAGENCY AND PUBLIC CONTACT ACTIVITIES

Federal Contacts

The following chart reflects the number and extent of federal contacts initiated and actions completed in preparation of the draft statement. The comments received from the federal agency contacts were considered in preparation of the statement.

Agency	Nature of Contact	Response	Action Taken
U.S. Forest Service	Request staff and data assistance	Yes	Provided one interdisciplinary team member and data assistance
Office of Surface Mining, Reclamation and Enforcement	Discussed requirements of surface occupancy plan	Yes	Provided information on new proposed regulations and future action to be taken
U.S. Geological Survey (Conservation Division and Regional Coal Team)	Request staff and data assistance	Yes	Provided one interdisciplinary team member and data assistance
U.S. Fish and Wildlife Service	Request data assistance and formal consultation as required by Section 7 of the Threatened or Endangered Species Act.	Yes	Provided data assistance and formal consulation on threatened or endangered species (formal consultation was initiated, a copy of the biological opinion is attached as Letter A).
Environmental Protection Agency	In compliance with Clean Air Act (Sec. 309) and Water Pollution Control Act (P.L. 92-500); requested data assistance and discussed permits	Yes	Data assistance provided
U.S. Corps of Engineers	Discussed need for permits	Yes	Need for permit was explained and reference has been incorporated in this ES.

Agency	Nature of Contact	Response	Action Taken
U.S. Bureau of Reclamation	Request assistance in consultation and review; discuss water use	Yes	Provided assistance and coordination
National Park Service	Presented visibility studies	Yes	Provided response on concerns (see attached Letter B.)
Heritage Conservation and Recreation Service	Request information on National Register of Historic Places	Yes	Provided information as requested
Soil Conservation Service	Requested data assistance	Yes	Provided data and assistance for evaluating impacts to prime and unique farmlands

In addition, on March 22, and April 16, 1979 during the public review period two meetings were held in Salt Lake City with representatives of the U.S. Fish and Wildlife Service, Utah Division of Wildlife Resources, Utah Division of Water Rights, U.S. Bureau of Reclamation, and the Bureau of Land Management to discuss the effects on the Desert Lake Waterfowl Management Area from converting agricultural water to industrial use in Emery County. At the April 16, 1979 meeting, representatives from the Utah Power and Light Company stated that no water would be converted from any drainage tributary to Desert Lake.

State Contacts

The Emery ES team has established an effective working relationship with state agencies in Utah. Many agencies of State Government having jurisdictional interests in the project have been contacted and have supplied statement data.

Agency	Nature of Contact	Response	Action Taken
Utah Division of Wildlife Resources	Request staff and data assistance	Yes	Provided one staff member and data assistance.
Utah Environmental Coordination Committee	Briefed committee and requested review of statement.	Yes	Committee briefed.
Utah Division of Oil, Gas, and Mining	Request data assistance and review of statement	Yes	Provided data.

Agency	Nature of Contact	Response	Action Taken
Utah Branch of Environmental Health	Request technical consultation.	Yes	Provided data assistance.
Utah State Historic Preservation Office	To comply with National Historic Preservation Act; preparation of memorandum of understanding.	Yes	A "Memorandum of Understanding" between the Bureau of Land Management and the State of Utah has been prepared and attached as Letter C.
Utah Department of Transportation	Discussed permits	Yes	Jurisdictional concerns satisfied.
Idaho Department of Fish and Game	Request data assistance.	Yes	Provided data assistance.
Utah Energy Office	Participated in the Interagency Task Force on Power Plant Siting	Yes	BLM furnished data to this task force.

Local Government

Many public officials at the local level were advised of the project. Their views and comments were considered in preparation of the statement.

The following have been consulted:

County Governments

Emery County Commissioners
Utah County Planners
Six County Commissioners Organization
Southeastern Utah Association of Governments
Caribou County Recorder, Idaho

Public Contacts

On April 29, 1978, Utah Power and Light officials hosted a tour, including members of the interdisciplinary team, of their proposed Units 3 and 4. The tour covered the proposed transmission line, the Wilberg Mine, the Coal Haul Road, the proposed Cottonwood Portal, the Cottonwood Creek diversion, and the plant site. Representatives of the Sierra Club, Audubon Society, and League of Women Voters were present. A meeting was held in connection with this tour and concerns of the participants were recorded and used in the preparation of the statement. On May 8, 1978, the BLM received written comments about Units 3 and 4 from one of the tour participants.

The BLM Richfield District mailed information sheets for the proposal and alternatives to 300 individuals in May of 1978. Three responses were received.

A public meeting was held on September 13, 1978 to provide an opportunity for concern citizens to comment upon the wilderness review done for this ES. About 25 individuals attended.

COORDINATION IN REVIEW OF THE DRAFT STATEMENT

The following list represents government and nongovernment organizations that received a copy of the draft statement and were requested to submit written comments. Those organizations that responded to the draft are shown with an asterisk (*).

Federal Agencies

- Advisory Council on Historic Preservation
- Department of Agriculture
  - Forest Service*
  - Soil Conservation Service*
- Department of Commerce
  - National Oceanic and Atmospheric Administration
- Department of Defense
- Department of Energy
  - Office of Energy Research
  - Office of Environment
  - Western Area Power Administration*
- Department of Health, Education and Welfare*
- Department of Housing and Urban Development
- Department of the Interior
  - Bureau of Indian Affairs
  - Bureau of Mines
  - Bureau of Reclamation*
  - Fish and Wildlife Service*
  - Geological Survey*
  - Heritage Conservation and Recreation Service*
  - National Park Service*
  - Office of Surface Mining, Reclamation, and Enforcement
- Department of Labor
  - Mine Health and Safety Administration
  - Occupational Safety and Health Administration
- Department of Transportation
  - Federal Aviation Administration*
  - Federal Highway Administration
- Environmental Protection Agency*
- Federal Energy Regulatory Commission*
- Interstate Commerce Commission

State Agencies and Entities

- State of Utah
  - Utah State Agencies Clearing House (A-95)*
  - c/o State Planning Coordinator

Local Agencies

Board of County Commissioners
  Carbon, Emery, Garfield, Salt Lake, Sanpete, Sevier, Utah, Millard, Piute, Juab all in Utah; and Caribou in Idaho
Mayors of Castle Dale, Emery, Escalante, Ferron, Helper, Huntington, Orangeville, Price, Provo, Richfield, Escalante, Marysvale, Delta, Nephi, all in Utah; and Soda Springs and Bancroft, Idaho.
Six County Commissioners Organization
Southeastern Utah Association of Governments

Nongovernmental Organizations

Archaeological Society of Utah
Canyon County Coalition
Chamber of Commerce (Carbon County)
Chamber of Commerce (Salt Lake Area)
Common Cause
Council on Utah Resources
Defenders of the Outdoor Heritage
Defenders of Wildlife
Desert Protective Council
Enchanted Wilderness Association
Environmental Defense Fund, Rocky Mountain/Great Plains
Escalante Wilderness Committee
Friends of the Earth
Good Earth
Izaak Walton League - Utah Division
ISSUE
League of Women Voters
Mearns Wildlife Society
Mineralogical Society of Utah
National Parks and Recreation Association
National Wildlife Federation
Natural Resources Defense Council, Inc.
Nature Conservancy
Rocky Mountain Center on Environment
Rocky Mountain Federation of Mineralogical Societies
Rocky Mountain Sportsmen Association
Save Our Canyons Committee
Sierra Club
Society of Conservation of Bighorn Sheep
Utah Audubon Society
Utah Cattlemen's Association
Utah CLEAR
Utah Environment Center
Utah Farm Bureau
Utah Geological and Mineral Survey
Utah Lung Association
Utah Mining Association
Utah Nature Study Society

Utah Sportsmen Association
Utah Water Users Association
Utah Wildlife and Outdoor Recreation Federation
Utah Wool Growers Association*
Wasatch Mountain Club
Western Rockhound Association
The Wilderness Society
Women's Conservation Council of Utah

Private Companies, Universities

American Coal Company
Brigham Young University
College of Eastern Utah
Intermountain Consumers Power Association
University of Utah
Utah Power & Light Company
Utah State University

PUBLIC HEARINGS

The schedule for formal public hearings was published in the Federal Register on February 26, 1979. A news release announcing the formal public hearings was issued during the first week of March, 1979. The release was sent to newspapers in Carbon and Emery counties and to newspapers in those communities along the entire proposed transmission route. The hearings were held in Price, Utah on April 17 and in Salt Lake City, Utah on April 18, 1979.

Mr. Paul Howard, Utah State Director, Bureau of Land Management, presided at each session with the following as panel members:

Carl Thurgood	Team Leader, Environmental Statement Proposed Emery Power Plant.
Lavar Richman	Hydrologist, Bureau of Reclamation
Larry Hudson	Forester, United States Forest Service
Bill Wagner	Air Quality Specialist, Bureau of Land Management

Seventy-nine persons attended the hearing in Price; 14 presented testimony. At Salt Lake City, 19 persons were in attendance and 4 testified.

REVIEW PERIOD FOR WRITTEN COMMENTS

The Draft ES was issued February 16, 1979. The Notice of Availability was published in the February 26, 1979 issue of the Federal Register. The notice also announced a 45-day public review and comment period, ending April 12, 1979.

In addition to the Federal Register notice, a news release was issued during the first week of March, 1979, by the BLM to 11 newspapers and 11 radio stations and television stations.

After publication of the Notice of Availability, copies of the Draft ES were mailed to federal, state, and local government agencies and to nongovernment organizations for their review and comment. Approximately 600 copies of the statement were distributed. Eight public and university libraries were provided copies. In addition, official reading copies were made available to the public at the following locations:

Bureau of Land Management
Utah State Office
University Club Building
136 East South Temple
Salt Lake City, Utah 84111

Bureau of Land Management
Richfield District Office
150 East 900 North
Richfield, Utah 84701

Bureau of Land Manageent
Price Area Office
900 North 700 East
Price, Utah 84501

College of Eastern Utah Library
451 East 400 North
Price, Utah 84501

Emery County Library
Castle Dale, Utah 84513

Harold B. Lee Library
Brigham Young University
Provo, Utah 84602

REVIEW PROCEDURE FOR PUBLIC COMMENTS

Only those comments that addressed the adequacy of the Draft ES were selected for response. Comments presenting new information, questioning data or analyses, or raising questions and issues bearing directly upon the Draft ES were fully considered and evaluated. All comments as received in the hearings and in letters, were reviewed to determine whether they met the above criteria for consideration for inclusion in the Final ES.

Many comments were similar in substance. Consequently, in the sections that follow, the reader is referred to the initial response in answer to all similar comments. The letters from governmental agencies, private organizations, and "recognized experts" are reproduced in the order in which they were received. All other comment letters were considered and responses are included in the following pages.

In contrast to many letters and comments received on past statements only one letter received commenting on the Units 3 and 4 proposal presented a "for" or "against" attitude (this letter was against). Most letters were substative and applicable to the purposes of the ES.

The hearing transcripts and all written comments are available for public review at the BLM, Richfield District Office, 150 East 900 North, Richfield, Utah 84701.

GENERAL COMMENTS

All comments received were reviewed. Specific comments are discussed in either the hearings section or written comments section which follow. One issue was raised by a large number of persons and is discussed here:

General Comment No. 1

Four people testifying at the hearings and 20 of the 39 letters received were concerned with the possible subsidence identified on East Mountain above the mining area. They indicated particular concern over loss of water, danger from cracks, displaced rocks and earth, and damage to structures.

Response: Further study since preparation of the draft still indicates that subsidence could occur as described previously. Appendix II-1 gives examples of what has occurred at other locations on the Wasatch Plateau-Bookcliffs Coal Fields. The U.S. Geological Survey's Regional Mining Supervisor recently informed BLM that 6 feet of subsidence has been observed at the Convulsion Mine near Salina Canyon and 1 inch surface cracks were evident.

The USGS Water Resource Division will monitor the hydrology (as explained under monitoring in Chapter 1).

In the event that water is diverted by subsidence away from springs, Utah Power and Light would be required [30 CFR 211.40 (a) (7)] to replace water at the site. Also under proposed regulations (30 CFR 817.124) now expected to take effect in October, 1979, Utah Power and Light could be required by the Office of Surface Mining to mitigate subsidence caused damage by restoration, rehabilitation or removal and replacement of surface structures; purchase of damaged structures or features and restoration of surface to premining capability or by providing surface owners with prepaid insurance to cover the loss in property values. The regulations also require that a mining plan be prepared that would use the best technology available to minimize and reduce subsidence-caused damage. The mining plan must contain at least the following:

> (a) A description of the mining method; (b) A description of measures taken to prevent subsidence causing material damage; (c) A description of measures taken to mitigate damage; and (d) A description of measures taken to determine material damage, including monitoring proposed.

HEARING COMMENTS AND RESPONSES

Individuals Who Presented Statements

Speaker	Representing	Location of Hearing
Rey Lloyd Hatt	Self	Price, Utah
Duane Frandsen	Rey Lloyd Hatt	Price, Utah
Jesse J. Peacock	Cottonwood Creek Livestock Association and Self	Price, Utah
Newell Crawford	Castle Dale City Council	Price, Utah
Rue Ware	Emery County Commission	Price, Utah
Glen Bott	Self	Price, Utah
Jerry Bott	Self	Price, Utah
W. Gordon Wankier	Utah State Extension Service	Price, Utah
Montell Seely	Self	Price, Utah
Michael Smith	Mayor of Orangeville	Price, Utah
James Catlin	Sierra Club, Utah Chapter	Price, Utah
Darell LeMaster	Castle Valley Special Service District	Price, Utah

Speaker	Representing	Location of Hearing
Carl Bott	Utah State Department of Agriculture	Price, Utah
Margaret Gruschow	U. S. Forest Service	Price, Utah
Jesse Peacock	Cottonwood Creek Livestock Association and Self	Salt Lake City, Utah
Edward S. Crawford	Self	Salt Lake City, Utah
Gordon Anderson	Friends of the Earth	Salt Lake City, Utah
Vaughn Hansen	Vaughn Hansen Associates	Salt Lake City, Utah

Comments by individuals who spoke at each hearing and the response to the comments are presented in order of the appearance of the speaker. The speaker's name is listed first and then the location of hearing. Comments ambiguous in nature or for which no specific reply was deemed necessary are not addressed herein.

Responses to Hearing Comments

a. Rey Lloyd Hatt and Duane Frandson

Comment: (Summary) Mr. Hatt and Mr. Frandson (Hatt's attorney) spent some time explaining the adverse effects on water from the construction of power plants and particularly the impoundment of water over the past several years. They were particularly concerned about continued loss of water quality and quantity for downstream users.

Response: In response to the testimony presented, Utah Power and Light is seriously considering the purchase of these downstream water rights and the alternative of impounding this and other water upstream on lower Cottonwood Creek or the upper San Rafael River. This alternative is discussed in detail in Chapter 8 as the section titled San Rafael River Reservoirs.

b. Duane Frandson

Comment: This is a supplemental statement to that I previously made. For identification, I'm Duane Frandsen from Price. One of the items that I neglected to mention was a recognition by Utah Power and Light that they did create a salinity problem to the lower water users on the San Rafael. I have before me a portion of the final Environmental Statement on the second unit of the Huntington Plant and it's dated February 7th, 1975. I read from page A-26 of that report, and this is prefaced by a statement that a withdraw of the water may create a salinity problem for downstream water users. This is at the bottom of the page: "Flushing of Huntington Creek by large releases from the reservoir" -- and I assume that's Electric Lake, because that's the reservoir that Utah Power and Light built there. Continuing, " . . . would be helpful in removing silt which has accumulated. Such a program is possible and is now being considered by the company and the U.S. Forest Service." Bear in mind this is in 1975. Up to this time the flush valve has not been pushed by Utah Power and Light to rinse out the alkali in the San Rafael River. At least they've not held it down long enough that any water, any fresh water, has reached the Hatt and the Diversion of these other water users. So I'd like to have this prior -- I think it's sort of a commitment placed in the record where UP & L has not performed.

Response: The comment is adequately answered in a subsequent comment by Ms. Margaret Gruschon at the Price public hearing. "My name is Margaret Gruschon, and I'm an employee of the Forest Service. And there are a lot of topics I'd like to address concerning this, but the one statement that was made concerning the flushing and flow of Huntington Creek to clean out the silt and solve the salinity problem, this flush was conducted last August and it was flushed as far as they were capable of doing it. They did leave the spillway open in the dam and we monitored the flush in that stream. And it was found out that silt was picked up below the dam, carried down the stream probably five miles and was deposited again."

c. Jessie J. Peacock

(1) Comment: A vastly increased volume of traffic on the narrow, steep Cottonwood Canyon Road as a result of the proposed mining activity, is totally incompatible with movement of livestock in the area. There is simply no way livestock can be driven on narrow roads with embankments while meeting or being overtaken by large volumes of traffic. Even if the Cottonwood Canyon Road is improved by widening, straightening and oiling, as proposed, the traffic and speed thereon will not permit safe movement of livestock. This is totally unacceptable to long-established users of this livestock driveway.

If this canyon road is to be turned into an industrial road, then a safe, fenced alternate driveway must be provided for livestock movement.

This Association proposes the required construction of off-highway livestock driveways on Highway U-2 from Grimes Wash to Cottonwood Canyon as a condition for approval of Utah Power and Light Company's mining proposal. The driveways would have to be fenced, cleared, and graded sufficiently to permit reasonable movement of livestock. Maintenance of driveway fences and other factors associated with the driveway would have to be the responsibility of the mining company.

A factor of significant concern to livestock users is the prospect of having two mining developments on opposite sides of the narrow Cottonwood Canyon at essentially the same location. The impact statement apparently does not consider the construction effect of placement of the UP&L mine directly opposite the already existing Robertson-Bell Mine. This bottleneck blockage of the canyon is of serious concern to livestock operators. It will "squeeze" livestock movement, it will virtually eliminate the migratory movement of game animals up and down Cottonwood Canyon.

Another factor to be considered in determining the proposed project's impact on livestock is the location of the U.S. Forest boundary, fence and cattleguard in the Cottonwood Canyon. At present, Trail Mountain and some East Mountain cattle drift down Cottonwood Canyon to the forest fence and proposed new portal site. As the ranges are ridden in the fall, cattle are pushed into the canyon as they are gathered, resulting in herds numbering several hundred gathering at the Forest Service fence awaiting the drive on down Cottonwood Canyon and down Highway U-29 to the Orangeville area. A vastly increased traffic pattern, through the cattle congregating above the forest fence and against the cattle guard,would only result in unacceptable livestock disturbance and safety as well as vehicle problems. It may be necessary to move the forest fence to a point above the mine area and establish a new livestock holding area.

Response: Unavoidable adverse impacts to cattle movement on U-29 and through Cottonwood Canyon has been identified in the statement. This effect is still unmitigated. In a recent meeting with Utah Power and Light Company, the BLM was informed that the company was working on this problem. The power company indicated that they would be willing to construct some type of fenced driveway or holding corrals, but were not willing to go so far as to build a frontage road or actually haul the cattle. A compromise agreement may be forthcoming, but we know of nothing at this time.

(2) Comment: The impact statement presents another very serious concern to the livestock users on the East Mountain grazing unit. On page 10 of Section 3, the statement says, "Subsidence following mining operations could intercept ground water aquifers above the mined area. Springs and other surface waters could be affected." Page 2 of section 5 says, "The magnitude of this impact (subsidence) cannot be determined. Were springs to dry up as a result of subsidence, all wildlife dependent on these springs would be affected and numbers reduced."

Other references are made throughout the impact statement to the unknown impact of subsidence as a result of mining activities on the ground water on East Mountain and in the Cottonwood Spring area up canyon from the mining area in Cottonwood Canyon.

Grazing on federal and private land above the UP&L mines is totally dependent upon the present widespread natural springs and other surface waters on East Mountain. Disruption of water sources would result in management problems and restricted usage on the grazing units affected. The mining interests must be held totally responsible for any infringement of deterioration of existing public or private grazing due to surface water interruption.

Response: See General Comment No. 1.

(3) Comment: I submit to you that this is going to reduce the value of my land, my ranching, my potential that I may have for other types of use for this property.

Response: There are 293.42 ± acres in this area owned by two land owners. Jesse and Barbara Peacock and Mervin and Sharon Gale Miles. This acreage is situated primarily in the bottom land and along the creek in Cottonwood Canyon. The land is 7.5 miles from Orangeville in Emery County, Utah. The elevation of the land is about 6,344 feet above sea level. Only about 50 acres in this acreage has been cleared and is under cultivation as irrigated land. The remaining acreage is hillside and river bottom lands. The vegetation type is sparcely covered native grasses, brush, and scattered juniper trees. The creek bottoms have cottonwood trees, juniper trees, and some brush and grass. Typically, the area is considered very arid.

The area is zoned by Emery County, presently as "M & G-1". This use is for mining, grazing, and agriculture. Use for recreation residential development requires a minimum of ten acres for each family dwelling. Also, there is a requirement for culinary water to be furnished from a state department of health approved minicipal water system.

For the highest and best use for this land to be recreational-residential development, it would have to have a favorable location and be able to comply to applicable zoning restrictions. The land would then have to be acceptable to the buying public.

The economic feasibility is an important consideration in the situation and concern raised in this case considering the restriction ordinance, the minimum lot size of 10 acres would allow the land owners 29 lots. The nearest approved water system is Orangeville City.

The economics are estimated to be as follows (John K. Bushnell, M.A.I., 1979):

Retail value of Lots			
29 lots @ $10,000 ea.		=	$290,000
Expenses			
Engineering	3,800		
Water System	490,000		
Sales & Marketing	58,000		
Cost to raw land	114,000		
		=	$665,800
Minus or loss		=	$375,800

Under present zoning restrictions and with present demand and market situations it is not economically advantageious to site the 293.42 (approximately) acres as having the highest and best use for recreational-residential development.

The present day value of the 120 acres of land in the N 1/2 NE 1/4 Sec. 7 and the NW 1/4 NW 1/4 Section 8 T 18 S, R 7 E. would be (John K. Bushnell M.A.I. 1979):

25 acres ± irrigated farmland @ $1,200	=	$30,000
95 acres ± dry grazing land and river bottom @ $200	=	$19,000
Total		$49,000
Assuming the remaining acreage in the area is similar to the above 95 acres, the 173.42 + acres @ $200.00	=	$34,684
Total Value		$83,684

The highest and best use would calcalate to be for mining, grazing, and agriculture as now zoned by the county.

There would also be no loss in property value to any remaining private lands if the industrial development as proposed were to build on a portion of the private land.

There is also considered to be no damage to surrounding private lands were the proposed industrial development placed on adjoining public lands.

The reasoning used in the above two paragraphs is due to the fact that the same uses as now exist could be carried on in a like manner even after the proposed development has been completed.

Reference apprasial: W. B. Prestwich and John K. Bushnell, M.A.1
Appraisor and Consultant
Real Estate Affairs.

(4) Comment: I submit to you that the public lands and the private lands are going to be one massive coal yard. There is no way short of complete coverage in all respects to keep that particulate under control. I

submit to you that the same thing is going to happen to Little Cottonwood stream, and to the Cottonwood River that has happened below other mining areas where uncovered trucks and where coal is mined, and that is the degradation of the quality of water that is flowing in those streams. I submit to you that that is pollution in one of its worst forms.

Response: In a literature search on this subject, we were unable to find where coal particulates in stream water creates a pollution problem. Degradation of water quality at mine sites is caused by the oxidation of pyrite materials which cause acid production. This is not expected to occur at this site as coals in the Rocky Mountain Coal Province contain little pyrite (USDI, 1974).

(5) Comment: The possibility of seeing a massive coal facility right there at the mouth of that canyon by every hunter, every fisherman, every person that goes up that canyon for a recreational purpose is something that ought to be kept in mind. I understand that we ought to put our use to the highest and most beneficial use.

Response: This impact has been analyzed within the statement as follows:

Chapter 2, (Land Uses-Transportation Systems) Cottonwood Canyon is described as "...the primary access road for recreation in Upper Joes Valley."

Chapter 3, (Scenic Resources) The environmental impact is discussed as follows: "The coal conveyor and truck loading site in Cottonwood Canyon would establish high man-made contrast in an area of presently low contrast. Aesthetics of the area would be degraded for recreationists using Cottonwood Canyon or U-29 for access to the Joes Valley area."

Chapter 5, (Scenic Resources). The adverse impact is discussed as follows: "The coal conveyor and loading site would degrade aesthetics of Cottonwood Canyon and Highway U-29.

Chapter 7. The contrast of the conveyor in recreation access areas is discussed as an irretrievable committment for the life of the facilities and structures.

d. Newell Crawford

(1) Comment: I'm with the City Council, and I would like to say that the City Council of Castle Dale is 100 percent against the proposed truck route from the Beehive Mines to the plant as it goes through our town, and what will be our town and some of our best farms. We think there are better places for this road to be built.

Response: In a letter dated August 6, 1979, UP&L has stated that they would prefer to build the interconnecting coal haul road along the alignment shown on Figure 8-12. This alternative alignment would cross only BLM land and would route coal trucks around Castle Dale and Orangeville.

e. Rue Ware

(1) Comment: Reference is made in the statement that one million tons of coal per year will be moved from the Deseret-Beehive Mine to Units 3 and 4. Is this in addition to the coal that is moving along that route to Unit 1? This is not in addition, this is the same coal? We are not going to use that coal for Unit 1 any more is that correct?

Response: This is the same coal. Utah Power and Light has indicated that it is only a change in use. Coal that is currently being mined at the Deseret-Beehive Mine would be dedicated in the future to use at the Units 3 and 4.

(2) Comment: It made reference to the route that the trucks now take, which is through Castle Dale, in hauling the coal from the Deseret-Beehive Mine to the plant, and that is not true. That truck route is not through Castle Dale. It's through Main Street in Orangeville, from the north end through the south end, the entire length of Main Street.

Response: The text on page 1-16 has been modified to state that the road would be built to route trucks around the towns of Castle Dale and Orangeville. Also see response to Comment (1) from Mr. Newell Crawford.

(3) Comment: I suggest that we bring to light, if at all possible, the facts relating to thirty percent of the coal over that 35 year period that would be purchased. I feel that the people need to know where that coal will come from, the mining methods, and the methods enroute of transportation.

Response: Purchase of coal would not be required until 1995. At that time a new mining plan might have to be developed and additional environmental studies completed. Utah Power and Light has requested that additional federal leases be made available in the area. The proposal is pending.

(4) Comment: The draft, makes reference to culinary water for the Cottonwood Portal during the early development phase would be hauled from Orangeville City, I would find that they have had no comment made to them, or questions asked or arrangements made for that water. I think it would be sad if that time comes and there is not culinary water, or Orangeville City is left short because of the water needed at that portal in Cottonwood Canyon.

Response: The use of 5,000 gallons of water per day would represent about that amount of water used by three families. The draft identified that the Orangeville water system would be short water for about 230 families. The 5,000 gallons would add to this shortage, and would probably not be available.

(5) Comment: I suggest that this actions and the findings of the archaeologist, the paleontologist, and the botanist, as referred to in this draft statement, be made available to the local people; that the local people be kept informed and fully aware of findings of interest, and I would recommend that any artifacts or items found would in turn be housed in the museum located at the County seat in Castle Dale, and not moved from the county.

Response: Summaries and records of all studies done in connection with the statement are in file with the BLM and are available for appropriate public uses. The BLM's present policy regarding artifacts discovered during cultural resource inventories is to analyze and record in the field all cultural resources and artifacts. Should artifacts be removed during salvage operations, arrangements can be made to have then housed in local museums.

(6) Comment: I appreciate the recognition of the problems of livestock movement along highways U-29 and U.S. Forest Service Road 50040. I encourage continued cooperation and effort to solve this developing problem for which a

solution must be found. In no way can this change in the traffic pattern along these two roadways be allowed to occur without consideration being given to the movement of livestock, farm implements, and recreation vehicles without a solution reached that would be agreeable to all.

Response: See response to Comment No. 1 from Jessie J. Peacock.

(7) Comment: Reference is made to surveys in the draft statement. Surveys have been made in Castle Valley to determine how the new comers are being received by the old timers, and how the old timers are being accepted by the new comers. I make reference to a study of 1979 wherein response was asked to rate their community neighbors. I suggest that these result of these surveys be made available to local people so that those communities may make changes where needed in order that they might live compatibly together.

Response: The results of these surveys are readily available through Dr. Stan Albrecht, Department of Sociology, Brigham Young University, Provo, Utah 84602. A small fee might need to be charged to cover the costs of copying, or of running special computer tabulations.

(8) Comment: I suggest that in Emery County where 71 percent of the newcomers will settle, and where no survey was taken, and no solutions were attempted, that this is an issue which has been ignored by the statement and needs to be dealt with. I recommend that consideration be given to this in the final statement.

Response: The data on public attitudes and satisfaction with the local community come from three basic sources:

1. a public survey conducted in Carbon and Emery counties in 1975 for the Utah State Advisory Council on Science and Technology to determine some of the social impacts associated with energy developments in Carbon and Emery counties.

2. interviews conducted with community leaders and other key informants in both counties in 1977 that were specifically a part of the Units 3 and 4 impact study.

3. a 1978 survey conducted by Albrecht in Carbon County as part of a larger project designed to monitor changes in communities that are experiencing energy-related population growth.

Only the second data source was developed specifically for this study and the other two have been treated as supplementary to increase public knowledge and information about potential impacts associated with energy development. The key informant interviews conducted for this study in both counties were very supportive of the public survey data. Residents in both counties quite willingly identified problems that have been associated with rapid population growth, including problems of providing services for the new residents and some attitudinal and value conflicts between newcomers and some of the oldtime residents of the area. However, all three studies indicated that a clear majority of area residents favor continued moderate growth and feel that problems that have emerged are being solved.

(9) Comment: With hesitation I bring this to your attention. My concern is the trucks that are now using Main Street in Orangeville as a coal haul route when there is a magnificent haul route approximately three quarters of a mile to the west. That is a city street, Main Street in Orangeville. It is not a county road, not a state road. It is a city street. It terminates on the south end of Orangeville onto a county raod. The county road, approximately a half a mile later, then terminates onto a state road known as the Wilberg haul road. Those trucks are now transversing Orangeville City Main Street. It's my concern that those trucks are there, and it's surely my effort to see that we can do everything possible to move those trucks out of town. Reference is made in the Draft Statement that those trucks are now using Castle Dale, and that is just not so. I don't blame them for not using the county road down past the high school in Castle Dale, but I submit to you that Orangeville will be in exactly the same condition. So, it is with hesitation, but it must be done. On page 16, Section 1, and I quote, "About one mile of new road would be constructed over private land to route coal trucks around the town of Castle Dale." Page 17, Section 1, the map shows the location of that road. I suggest that the location of that road be moved and located as shown in Section 8, page 62. On page 62 in Section 8, the road as shown as being at a point, or beginning at a point approximately one to one and-a-half miles downhill from the Deseret-Beehive Mine, and traveling in a westward direction over the Wilberg haul road to intersect there about one mile north of U-29. The moving of this road would eliminate many problems, problems that would exist if this road is permitted to slice like a cleaver through an apple between two small communities of Orangeville and Castle Dale. It would split these two small communities. Those two small towns who have been very compatible. It would split those two small towns with a ribbon of asphalt and a never ending chain of coal trucks. It would completely eliminate a possibility for Castle Dale to grow to the west, and for Orangeville to grow to the east. Orangeville would become a town hemmed in on three sides, the east, the south, and the west by a never ending chain of coal trucks. Yes, Orangeville is a small community, but we do not want it to be surrounded by coal haul roads with a never ending chain of coal trucks. Two is enough. The one we have now surrounds us on the west and the south. We would like to settle for that. This road if it would be built in the proposed location would mean that approximately every five minutes a truck would make a right turn onto Highway 29, travel one half mile, make a left turn off from Highway 29, beyond Highway 29, for approximately one minute. We would then have approximately three minutes without a truck on that road, on that half mile stretch. That's assuming it's going to take one minute, which it takes me in my car, to travel that distance from the stop from the bottom of the hill, to make the left. It means we are going to see 100 seconds without a truck.

I submit to you that one half mile of road on Highway U-29 would become as Highway 101. U.S. 101 is known as slaughter avenue. I submit to you that this is exactly what would happen, and this we can not live with. We can not sacrafice the safety of our people, in turn and death, by this decision to build this road in our back yard. It can not be tolerated. The alternative is given consideration on page 8-62 and 8-63. I strongly recommend that the alternative route be given priority, and eliminate the highway splitting the two towns.

On April the 4th, 1979, three County Commissioners had a meeting in Castle Dale in County seats and went on record with a motion duly made and seconded and passed unanimously that we would do everything in our power to oppose the location of that road between those two towns.

Response: The text has been modified to state that the road would be built to route trucks around the towns of Castle Dale and Orangeville. However, in a letter dated August 6, 1979, UP&L has stated that they would prefer to build the interconnecting coal haul road along the alignment shown on Figure 8-12. This alternate alignment would cross only BLM land and would route coal trucks around Castle Dale and Orangeville.

(10) Comment: Page 2-36, coal and other materials falling from uncovered trucks. The statement indicates it's a hazard, and in some cases will cause danger to other vehicles, and in some other cases, injury and death to other people. I think this is a condition that we can no longer live with, and I submit to you that there is a solution that this draft statement does not indicate any solution to that problem. I submit to you to simply cover the trucks.

Response: The solution might be to have local and state law enforcement officials enforce compliance with Section 27-12-146 of the Utah Penal Code which states:

> "No vehicle shall be driven or moved on any public highway unless such vehicles is so constructed or loaded as to prevent its contents from dropping, shifting, leaking, or otherwise escaping therefore..."

(11) Comment: There is a proper time to construct these plants. The time is prior to the construction workers that are presently here moving away. The construction workers that are now employed by Unit 2 will move out of the area, if Unit 3 is not ready for construction by that time. We do not want a lag between Unit 2 and 3. We do not want a lage between 3 and 4. It would be advantageous to all if we are able to move smoothly from Unit 2 to Unit 3 to Unit 4. The move is most difficult, and intolerable. It is difficult for many, the land owner, the landlord, the parents, the schools, the law enforcement, and the families.

Response: From a social and economic perspective, there are numerous reasons for phasing in the construction of Unit 3 prior to the completion of Unit 2. As shown in the following table, it is anticipated that there is very little overlap between the construction of Units 1 and 2 and Units 3 and 4:

Construction Employment
(average annual)

	Units 1 and 2	Units 3 and 4
1975	197	---
1976	611	---
1977	1,060	---
1978	881	---
1979	625	4
1980	275	136
1981	---	406
1982	---	937
1983	---	425
1984	---	609
1985	---	226

Because of timing of power needs and sequencing of construction with availability of equipment, the construction sequence is scheduled to procede as shown.

f. Glen Bott

(1) Comment: The present route that you suggest is a longer coal route to Units 3 and 4 from the Beehive Mines than the alternate route would be.

Second, it contains, as has been stated this evening already, definite traffic hazards.

Third, that it will be more expensive to construct the proposed route than it would to persue the alternate route. My interests are based mainly this evening because I am a land owner of the land that would be transected by the new alternate route. I understand that, and it has been stated by interviews and meetings held with you that State Power and Light officials--these projects are estimated from 50 to 45 year projects. In other words, they anticipate that period for the coal to be mined out and be available. In 45 years a road of this kind would be worthless. The present land that would be transected would be entirely worthless as far as agricultural values are concerned.

Response: See response to Comment No. 9 from Rue Ware.

g. Jerry Bott and W. Gordon Winkier

Comment: (Summarized) These two gentlemen voiced the same concern as Glenn Bott (previous commentor). The same response is applicable.

h. Montell Seely

Comment: (Summarized) Mr. Seely was concerned with subsidence above the mine and with the coal haul route between Orangeville and Castle Dale.

Response: Discussion on these two concerns are given as response to General Comment No. 1 at the beginning of this section and in response to comment No. 9 from Rue Ware.

i. Michael Smith (Major of Orangeville, Utah)

Comment: (Summarized) Mr. Smith was concerned about the coal haul route and the danger of uncovered coal trucks.

Response: The concerns are delt with in response to comments No 9 and 10 from Mr. Rue Ware.

j. James Catlin

(1) Comment: On April 10th of this year, Mountain Fuel Supply initiated a proposal for a coal gasification plant south of Emery. This plant--the output of this plant in terms of energy production will equal all six of the power plants now sited in the valley. The question is once all of the Emery plants are finished can the coal gasification plant be finished? The coal gasification plant will require water. It will require about half the water

of the summation of all the other coal-fired plants. It will produce less air pollution than the summation of those plants fitted with the best control equipment. It will produce more efficiently from the same coal and use heat.

Now, what's interesting is that the demand for this coal gasification plant appears to overlap the demand for Utah Power and Light's Emery 3 and 4. Utah Power and Light is trying to increase its market in home heating and in hot water heating. This long has been a favorite area by Mountain Fuel. By favoring one facility over the other facility it allows one industry to move in to that market more effectively. From my perspective, I would like to see the most efficent system used. I would like to see the least coal burned for the most energy. I'm concerned that we may be producing electricity where other alternatives are better. Coal gasification appears at this time to be better than electricity. There are conservation measures which have not been looked at which also appear to be quite useful.

Dealing with air quality, this is where we see the true conflict between future development in this valley and the projected increases in the number of coal-fired electricity plants. The study in the Environmental Impact Statement says that there is a long margin between what they estimate and the allowed degradation under the prevention of significant deterioration regulations. There is a couple of reasons to question their findings. One is that they have used a sulphur content in the coal that appears to be the best possible case rather than average case or worst possible case. Mountain Fuel uses a figure of 0.9 percent sulphur per . . . in their coal for their emission estimates from their proposed plant. UP&L uses 0.58 percent. The Geological Survey says that the range of the Hiawatha coal seam is between 0.5 and 1.2. In talking with EPA in Denver, they feel that this low figure of 0.58 will not be the figure they use in granting a permit to build this plant.

What all this come to is that the Emery 3 and 4, plus the other plants, may reach the limit of what is allowed in terms of degradation in sulphur in the air. And that the gasification plant may not be allowed to proceed. Coupled with this are the upcoming regulations on vibility. We don't know what they'll be at. It's conjecture that they will add a new dimension to power plant siting. We will be looking at regional visibility and the importance of this. And it may even more severely limit what we can do.

Response: The environmental statement has analyzed the amount of the PSD increment that would be used by Emery 3 and 4. Emery 1 and 2 are considered only as part of the background. EPA will also be analyzing the increment usage under the PSD permit review process. EPA has in the past implemented the PSD program and use of the imcrement on a first come, first served basis. The preamble to the PSD State Implementation Plan Requirements (June 19, 1978) states that it does not appear that this approach alone may be adequate to achieve the purposes of the act on a long-term basis. While EPA is administering the PSD permit program (it could be delegated to the state in the future), EPA will solicit and give careful consideration during the permit review process to the views of the state and local officials regarding the impact of proposed permit decisions on an area's potential for economic development. The preamble also states that states are free to choose the mechanisms for alloting the allowable increment to sources, including additional control of existing sources (offsite) in order to allow the constructon of a new source in an area where the increment would not otherwise permit the construction of a new source.

The coal quality data used in the document was based on approximately 290 coal samples taken from the seam to be used for Emery 3 and 4. The sulfur value determined from the sample was 0.56 ± 0.15 percent. The average value (0.56 percent) was used for analysis of the long-term concentrations and 0.71 percent (one standard deviation from the mean) was used for the analysis of the short-term-worst case concentration. The result of the calculations show that Emery 3 and 4 would not use the entire allowable increments.

Until EPA promulgates visibiliy regulations, we do not know what the atmospheric visibility constraints will be.

(2) Comment: As a minimum, if the plant is accepted, it should be fitted with the best available control technology. There seems to be some question in the ES whether that's necessary. I don't think in terms of encouraging other development in the valley, in terms of preserving whatever air quality is there that should be a minimum requirement.

Response: Unit 1 has an SO_2 scrubber operating at 80 percent efficiency and the scrubber for Unit 2 has been ordered for installation. The State of Utah Air Quality Bureau considers 90 percent SO_2 scrubbing now represents the best available control technology and Utah Power and Light proposes 90 percent scrubbing for Emery Units 3 and 4.

k. Darell LeMaster

Comment: In looking at the impact statement for No. 3 and No. 4, several references are made to the Service District and we do appreciate the somewhat superman status that has been given to us in the report. By that remark I'd like to read from page 319 of the report where we are talking about domestic water supplies. And the comment that is made--and I quote--"It appears with proper planning and with the financial capacity of the Castle Valley Special Service District that such facilities could be provided in time to meet the projected demand." Other comments on the sewer facilities also lead to the same conclusions, that the problems created from the additional growth could be handed off to the Service District and handled quite easily.

We are not sure that this is as easy as it is made to sound in the report. The tax revolt that I guess started in California and has spread to the rest of the nation is also in Emery County. And for the Service District to obtain any additional monies to start on any additional or new projects requires that we go out to the population for a bond election and require their approval. From comments that we receive from the public we're very doubtful that at this time such a bond election could be proposed and would carry through. This leaves us then with facing this increased growth without the funds and the capability to really handle the problem.

I would like to point out that we think that there are some errors or maybe oversights in the projections on the water and sewer requirements in the report. I might refer to page 323 which give a table with the water connections and the present capacities of the systems in the various towns. These numbers are not agreeing very well with the numbers that we're working toward and the numbers that we have. As an example, may I point maybe to the community of Huntington. We show in the impact statement that for the year 1989 there will have a population of 2,200 people. And on the other chart, we show 650--or I mean 725 water connnections in 1989. In March of this year, 1979, for our billing purposes with Huntington City we have a total number of water connections of 239. A recent census done by Huntington City indicates they have about 3,200 people. They have a possible connection as granted by the State Health Department of 1,000 connections. They recently released the moratorium on connections with the completion of a new water treatment facility, and within two weeks they have more subscribers than they had possible connections.

Response: Except for possibly Ferron, there are no accurate estimates of the current population of the Emery County communities. Furthermore, it is unlikely that precise population counts for these communities will become available before the 1980 census. Consequently, it is expected that currently there will be several different estimates of the current population of these communities and that there may be significant differences between these various estimates.

There are a large number of people who currently live in the Price River Valley but work in Emery County. Many of these people would like to move to Emery County and will probably make the move as soom as acceptable living conditions become available. This trend will be further heightened by the current shortages and high prices of gasoline. Consequently, the population of Huntington and other northern Emery County communities will increase--within limits-almost as rapidly as these communities increase their capacity to accommodate additional population growth. Therefore, it is not at all surprising that the additional water connections which became available in Huntington were all sold within 2 weeks.

There are no data available which will resolve these inconsistencies. It is possible that the 1979 population of Huntington is as high as 3,200; however, 2,300 appears to be a more reasonable estimate given active water connections and estimates of average household size.

The main point of concern appears to be that Huntington and other communities in Emery County are experiencing major growth, in part related to Units 1 and 2. Furthermore, the construction of Units 3 and 4 will put even more pressure on these communities before they have had time to completely adjust to the impact of Units 1 and 2. We are in complete agreement regarding the recent and anticipated growth of these communities. However, it should be pointed out that the construction work force required to build Units 3 and 4 are, or have been, in the area during the construction of Units 1 and 2. Consequently, the net increase over what is currently there due to Units 3 and 4 will relate almost entirely to the additional miners required after Units 3 and 4 are constructed.

Special Service District. It is quite right in saying that the problems of the Special Service District are not insignificant. However, the Special Service District--as a legal entity--has the basic responsibility for providing these services. If they do not do it, no other entity-at least at the present time can or will.

It is also correct to say that the voting members of the Special Service District want to minimize their personal taxes. However, a unique characteristic of the tax base in the District is that approximately 80 percent of the taxable assets are UP&L properties, mines, and other commercial properties. Hence, for every $1 of taxes paid by the residences of the district, $4 are parid by owners of the commercial properties. It, therefore, seems logical to assume that--within limits--the residents of the District will favor the upgrading of their roads and their water and sewer facilities since 80 percent of these costs will be borne by non-residents. However, we understand that even with this favorable tax base in the District, the residents may still reject bonding themselves to build the needed facilities. In which case, the Castle Valley Special Service District is limited in its ability to fulfill its basic charter: that of providing adequate roads and water and sewer facilities to the residents of the District.

(2) Comment: We have one other concern that is directly related to the Cottonwood Mining Facility and the coal loading facility. And part of that has been mentioned in Mr. Peacock's statements concerning the septic tank and leach field facilities. One of our main concerns is providing a water that is safe and completely free from any health problems to the people that drink it. And any time that we propose a sewer facility and leach field within a short distance from our surface supply stream we become concerned. Not to say that this might not be able to work, but we would like to see more details on this suggested alternate. And would suggest that maybe other ways might be handled for taking care of that small amount of sewage, maybe even hauling one of the septic dumps to one of our existing facilities in the valley.

Response: The drain field would not affect the stream. The state requires drain fields to be 100 or more feet from live water. The drain field would be at least 600 feet from Cottonwood Creek.

(3) Comment: I have one other question that I would like to ask and this concerns the water that will be provided at the Cottonwood Mine. I'm not clear in the report whether they will be buying that water from Orangeville or if they propose a package treatment plant at the facility. Can someone answer that?

Response: The company proposes to use about 5,000 gallons per day of domestic water from Orangeville during construction. After other early mine development occurs, it is anticipated that the mine would produce enought water for operations, and a treatment facility would be built at the mine-site.

l. Carl Bott

(1) Comment: Upon investigating this in several places where these power lines have been run in, we are finding that noxious weeds that are foreign to this area have been introduced. And now, some means have been brought forward both by the BLM on other occasions and also the Forest Service in the counties to help control noxious weeds. And by law through the State Legislature there are certain weeds that we are required to control.

It is my suggestion as a final draft on our environmental statement comes out that this be considered that control of noxious weeds be enforced. That compensation be made either to the agencies or to the county or to the state involved that will be required to control these. I'm not stating that chemicals should be used. I'm just saying the best methods should be used and this should be taken into consideration.

Response: The Federal Noxious Weed Act of 1974 (P. L. 93-629, Jan 3, 1975, 88 Stat. 2148) obligates BLM and other federal agencies to the control of noxious weeds. This law will be enforced in any BLM or BLM authorized action.

This has been added to Chapter 1 of the Emery Units 3 and 4 environmental statement. It is number 18 of standard measures required of the applicant by federal agencies.

m. Jessie J. Peacock

Mr. Peacock made the same comments at the hearing in Salt Lake City as he did in Price. No further response is required.

n. Margaret Grushow

Ms. Grushow commented in response to Mr. Duane Frandson's comment as discussed previously, therefore, no response is required.

o. Edward S. Crawford

Comment: (Summary) Mr. Crawford voiced concern over subsidence and possible water loss and about congestion and cattle movement in Cottonwood Canyon.

Response: Both of these concerns have been discussed in responses to previous comments. See response to General Comment No. 1, and comment No. 1 from Jessie J. Peacock.

p. Gordon Anderson

(1) Comment: First of all, the air quality analysis. I'd like to first reaffirm our commitment of the air quality to preserve the interest of the air quality of the southern Utah power plant region of the visibility protection ammendment which was inspired by Friends of the Earth, and we certainly intend to see that its provisions are carried out.

The Cramer study indicates the visibility in the region class 1 air quality area will be affected. Although the regulations persuant to the visibility protection ammendment are not out, we believe the purpose of the law and intent of the law is quite clear. The clean air act does require the prevention of any future, as well as their remedy of any existing impairment from man-made air pollution in the class one areas. Thus, we believe the Emery 3 and 4 plants should not be built unless they can fully meet the goals of this ammendment.

Now, regarding the visibility impacts that are already occuring as a result of Emery 1 and 2, which we believe are significant, I'd like to state that unless the Utah Power and Light can somehow resolve the continued failure to operate the sulfur dioxide scrubbers as required, we will be forced to seek compliance to a court action.

Response: The Cramer Study does indicate that visibility will be impacted in certain of the Class I areas in the region. The significance of the impact will depend upon the forthcoming visibility regulations and the position and policy of affected land manager (in this case the National Park Service) related to adverse impacts on air quality related values (including visibility). This is discussed in the text.

Utah Power and Light has installed and is operating sulfur dioxide scrubbers on the second unit of Hunting (Huntington 1) and on the first unit at Emery (Emery 1). The scrubber has been ordered for installation in Emery 2.

(2) Comment: Now, another deficiency we believe exists in the Draft Environmental Impact Statement is the assessment of alternatives which are required, but they really are only given a cursory treatment at best. For example, some of the alternatives to the power plant, solar power is given three paragraphs in the statement. Conservation, basically none.

Response: In order to avoid redundancy in power plant environmental statements, it is the policy of the Department of Interior to present only short discussions on alternative energy sources. A complete discussion of alternative energy sources can be found in "Energy Alternatives: A Comparative Analysis," which was prepared for the Council on Environmental Quality and several other governmental agencies by the University of Oklahoma (1975).

(3) Comment: Something else that deserves review is Utah Power and Light's motto. We believe multiple regression analysis which plans the future by looking backward is inappropriate. The time has come to turn around and plan for the future in a more realistic way. The continuation of a policy by futility which depends on centralized power plants requiring enormous capital investments which are reflected in higher electric bills will ultimately precipitate the kind of consumer revolt of futility which we wish to avoid, as would us all.

We do have an alternative to this. It is not discussed in the environmental impacts statement, but let me briefly review what it would consist of.

Many people who could use energy saving devices, insulation, and such things as this, lack the money to do so while at the same time the capital costs of building centralized power production and delivery systems is driving utilities towards bankrupsy. A more logical approach to solving both problems would be to transfer capital loans from the utilities to the consumer. This could make energy, effeciency, and technology available to all while making utilities financially healthy to the benefit of both. Capital transfers of this nature would simultaneously help to increase employment, clean up the environment, decrease inflation, as well as interest rates. So utilities now loan money to consumers for insulated homes because insulation is a cheaper heat source than new power plants. In one state, Oregon, has already mandated such loans. There should be some conditions to this arrangement. The utilities should loan the money at the same rates of interest at which they would otherwise loan themselves money for new plants. Borrowers should repay these loans through their utility bills at the same rate at which the fuel saving investment is expected to save them money. This saving could be computed against the energy price the consumer would have paid if utility had met his or her needs by building a new plant instead. Utility would only loan the money and it would be an unsecured loan, and it would not be added to the rate base. Utilities profit at the normal regulated rate. It would be from interest on the principal loaned, and would equal returns that the utility would otherwise have earned from a new plant. Both consumer and utilities would benefit from this system. Consumers could heat homes more cheaply without having to pay extra for their improvements. Insulation and solar heat would also protect consumers from future rate hikes. This fuel saving investment would make costly new plants, such as Emery 3 and 4, unnecessary, and would save utility money and fuels by using the present capacity much more effeciently.

All these things would help avoid rate hikes in the first place. Power plants often take 10 years to build, and then 30 years to repay their cost. Conservation and solar investments take weeks or months to build, and pay for themselves in 1 to 10 years. Thus, a transitional process by which the utilities once saw as a threat would then become an opportunity for consumers as well as utilities to reach a common goal.

Response: We acknowledge this comment. The text has not been modified.

Utah Power and Light has indicated that they do not have authority to participate in this type of program. This may be an item that should be presented to the Public Utilities Commission during their next hearings.

q. Vaughn Hansen

(Summary) Mr. Hansen indicated that a commendable job had been done and was grateful for BLM's effort, therefore, no response required.

WRITTEN COMMENTS AND RESPONSES

Written comments are presented in chronological order in which they were received.

Letter No.	Commenter	Representing
1.	Fred H. Jaeger, Jr.	Federal Aviation Administration
2.	Clair R. Acord	Utah Wool Growers
3.	J. Phillip Keene, III	Utah State Historic Preservation Officer
4.	K. Chad Wilkins	Soil Conservation Service
5.	Frank S. Lisella	Health, Education, and Welfare
6.	Glen T. Bean	National Park Service
7.	D. W. Webber	Bureau of Reclamation
8.	Evan O. Elan	Self
9.	Glen T. Bean (supplement)	National Park Service
10.	William W. Lindsay	Federal Energy Regulatory Commission
11.	Kent Briggs	Planning Coordinator, State of Utah
12.	William C. White	U.S. Fish and Wildlife Service
13.	George D. McMillan	Soil Conservation Service
14.	H. Wendall Sullivan	Self
15.	Curt Crowther	Self
16.	Albert and Elaine Gergle	Self
17.	Delray and Gay Hatch	Self
18.	John R. Wood	Self
19.	Mr. and Mrs. Paul K. Pearson	Self
20.	Curt Crowther, et.al.	Self
21.	Loren T. Johnson	Self
22.	Gordon E. Oborn	Self
23.	Florence R. and Rowland Gaumer	Self
24.	Richard E. Webb	Self
25.	Darrell R. Oborn	Self
26.	Ferris E. Hillyard	Self
27.	R. Arlow Oborn	Self
28.	Howard F. Stevens	Self
29.	Mrs. H. D. Hurst	Self
30.	H. D. Hurst	Self
31.	Mr. and Mrs Steven Healey	Self
32.	M. Dee Williams	Self
33.	Albert T. and Lois C. Armstrong	Self
34.	R. D. Davis	Utah Power and Light Company
35.	P. M. Rees	U.S. Forest Service
36.	Robert J. Arkins	Heritage Conservation and Recreation Service

Letter No.	Commenter	Representing
37.	Kenneth E. Vanlier	U. S. Geological Service
38.	A. M. Gabiola	Western Area Power Administration
39.	Alan Merson	Environmental Protection Agency

Response to Written Comments

Letter No. 1, Fred H. Jaeger, Jr., Department of Transportation, Federal Aviation Administration

(1) Comment: It is possible that during transmission line construction, when in proximity to aviation facilities, an adverse electromagnetic affect on air navigational aids could occur. If it appears that you will encounter this situation and have any questions, please contact the Federal Aviation Administration, Rocky Mountain Region, Airway Facilities Division, ARM-400, 10455 East 25th Avenue, Aurora, Colorado 80010.

Response: A telephone contact with the FAA at Aurora, Colorado established that the 345-kV powerline through the Provo area, that would be hung on the same towers as have been constructed for the 345-kV power line from the Emery 1 and 2 units, would not interfere with present navigational aids. A permit for the existing line was granted by FAA.

Letter No. 2, Clair R. Acord, Utah Wool Growers

Comment: (Summarized) Mr. Acord indicated his concern for what seems to be a constant whittling away of the farming and livestock industry, yet building up wildlife numbers and industrial areas. He is also concerned about wilderness lacking up resources that should be committed to food production. None of these comments addressed the adequacy of the ES and therefore no response is required.

Letter No. 3, J. Phillip Keene, III, Utah State Historic Preservation Officer

Comment: (Summarized) Mr. Keene emphasized the necessity of being responsive to the Antiquities Act and P.L. 93-291.

Response: The concern raised to be responsive to the law has been discussed in Chapter 1, Standard Requirements. These requirements and the binding "Memorandum of Understanding" shown in Chapter 9, will guarantee compliance with the laws.

Letter No. 4, K. Chad Wilkins, Soil Conservation Service

(1) Comment: I would be interested to know how many additional acres will be lost and how many additional sources of water will be needed and in what amounts. As you can see I was more confused than informed. If you retire 3,415 acres of farmland, is that for units 1 thru 4 or only units 3 and 4? This figure amounts to about 7% of our entire irrigated lands...

Response: The retirement of 3,415 acres of farmland, as discussed in the land use section of Chapter 3, is for the proposed Units 3 and 4. The environmental statement for Emery 1 and 2 indicates that 1,785 acres would be lost for those units. However, the proposal for units 1 & 2 included wet-dry cooling towers. Several factors, including cost, have led Utah Power and Light to install wet-cooling towers for all units. As a result, the total agricultural land retired could be as high as 6,386 acres for all 4 units. The possible increase in acreage required for Units 1 and 2 has been added to Chapter 6, which discusses the cumulative as well as long-term effects of the proposal.

(2) Comment: ...Also on page 1-30 concerning the fiberglass pipeline for water transportation, your EIS states that the pipe will be placed on a selected rock and sandfill cradle. Our standards require that fine materials with rock no larger than 1/4" in diameter be placed next to the pipe...

Response: Engineers from Utah Power and Light Co. indicated that the rock would be reduced to the 1/4 inch diameter specification through the means of a crushing machine. The term "selected" has been changed to "crushed".

Letter No. 5, Frank S. Lisella, Departmment of Health, Education, and Welfare

(1) Comment: The final environmental impact statement should address in more quantitative terms the situation concerning water and sewage facilities. If, in fact, the problem could be alleviated by the mere extension of existing water and sewage lines, then this could hardly be classified as an adverse impact. If more extensive alternations or modifications would be required, these alternatives should be addressed in the final environmental statement.

Response: Chapter 3 gives a detailed quantification of sewage requirements. We known of no other way of presenting the data. Table 3-14 contains considerable detail concerning shortages expected in the future, both with and without the proposal.

(2) Comment: The statement makes mention of trace elements being released into the atmosphere during operation. A more detailed description of these elements and the trace elements contained in the fly ash would be helpful in evaluating the final EIS.

Response: A new table (Table 1-6) has been added to the text to show trace elements found in coal typical of the area. Trace element budgets have been calculated for other power plants, but could not be verified by sampling. Literature shows that deposition of trace elements around power plants is minimal (AEC, 1973).

Letter No. 6, Glen T. Bean, National Park Service

(1) Comment: Meteorological Monitoring. Meteorological monitoring was done at 10 meters (temperature, humidity, wind speed, and direction) and at 50 meters (wind speed and direction). This appears to us to provide inadequate or limited data on inversion layers in the atmosphere.

Inversion data should be recorded up to and beyond 100 meters. High level inversions in conjunction with stack emissions and other sources of pollution appear to be a primary factor leading to a reduction in visual range at Arches and Canyonlands Natonal Parks.

Response: More detailed meteorologial monitoring beyond the 10 and 50 meter levels would certainly be desirable. Unfortunately these data are not available, therefore, Cramer conducted their analysis from the best data available from Castle Dale, Huntington, Dugway Proving Ground, Salt Lake City, and Grand Junction, Colorado.

(2) Comment: Ambient Air Quality Monitoring. In conjunction with gathering meteorological data to 100 meters and higher, air quality monitoring should also be 100 meters and higher. This would provide a more accurate picture of air quality than ground level measurements. Inversions trap pollutants and restrict dispersion at the inversion level, not ground level, and it is inversion conditions that create greatest visibility impairment at our parks.

Response: See response to Comment No. 1 above.

(3) Comment: The plume dispersion study (due summer 1979) by North American Weather Consultants mentioned on page 1-45 may have addressed the problem we have outlined, but this is not indicated and in any case the results are not in. If the study is relevant to the project, its results should have been discussed in this document. If not relevant, why was it conducted?

Response: The results of the NAWC plume dispersion study would be relevant to the document; unfortunately the results are not available to include in the FES.

(4) Comment: The discussion of visibility on page 2-4 gives a median visibility of 65-80 miles then apparently tries to diminish that distance with a statement concerning 70 to 90 percent reduction in visual range under specific conditions. Actually the northern end of Capitol Reef National Park is approximately 45 miles from the Emery site and well within the median visual range indicated. From that end of the park, the plume can be seen from the power plant and there are occasions when there is atmospheric discoloration noted. We have no reason to believe that this situation would not increase in direct ratio to the amount of pollutants two additional units would create. The Bureau of Land Management (BLM) statement, (Class I and BLM area of Special Interest, on page 2-4 includes the word, "practically." We know of no place in the Clean Air Act that makes that distinction.

Response: The intent of the identification of the 70 to 90 percent reduction in visual range under certain conditions was not to diminish the fact that good visibility (average 65-80 miles) exists in the area, but to identify the fact that even this good visibility is degraded at times by existing natural and/or human activities.

The atmospheric discoloration noted at Unit 1, under some meteorological conditions, is identified in the text and would be expected to increase in intensity and frequency with additional units brought into operation, unless some control is developed.

The work "practically" was taken from the PSD regulations (Dec. 5, 1974) which defines Class I as an area in which "practically any change in air quality would be considered significant." The Clean Air Act as amended August 1977 discusses Class I areas but does not define what a Class I area is. The preamble to the PSD State Implementation Plan Requirements (June 19, 1978) discusses a Class I allowable increment as permitting only "minor" air quality deterioration. Because there is an allowable increment for SO_2 and particulates (although very small) it was recognized that minor air quality deterioration would be allowed but practically any change in air quality would be considered significant.

(5) Comment: Assistant to the Regional Director Isenogle's memorandum of November 8, 1978, (letter No. 2 in the appendix) expressed our concerns about air quality relating to Class I areas. We recommend that the description of Emission Control Equipment on page 1-11 be modified to state that, "Each generating unit (Units 1-4) would be equipped with an electrostatic precipitator. . . and. . .scrubbers. . . ." We believe this will help assure that both the existing and proposed generating units will operate only with such equipment. Any permit issued for this project should include provision for continued monitoring to insure that the scrubbers have been installed for all four units and are being used.

Response: The Emery 3 and 4 Chapter 1 addresses only Emery 3 and 4 and the paragraph in page 1-11 states that each generating unit would be equipped with a wet lime SO_2 removal system (scrubbers) designed to remove 90 percent SO_2. The State construction permit for Units 1 and 2 was issued on the basis of 80 percent SO_2 scrubbing and has not been amended. Unit 1 has a scrubber installed and operating and the scrubber for Unit 2 has been ordered for installation.

Section 165(a)(7) of the Clean Air Act as amended August 1977 states that the person who owns or operates or proposes to own or operate a major emitting facility which requires a construction permit under PSD, agrees to conduct such monitoring as may be necessary to determine the effect which emissions may have or are having on air quality in any area which may be affected by emissions from the source. EPA could require monitoring under this paragraph. The proposed PSD regulations of the Utah State Air Quality Bureau also contain this provision.

(6) Comment: Page 3-8 recognizes the lack of Environmental Protection Agency guidelines of how to assess visibility impacts. In the absence of such guidelines, we must continue in the position stated in Mr. Isenogle's memorandum that any impairment of visibility in Class I areas is a violation of the 1977 Clean Air Act amendments.

Response: This position has been recognized in the text.

Letter No. 7, D. W. Webber, Bureau of Reclamation

(1) Comment: The Southeastern Utah Association of Governments' "208" study indicated that essentially all waters in the Emery, Carbon, and Grand Counties violate one or more of the State's current water quality standards (water quality is limited). This statement should evaluate the proposed power generating units and their impact and interrelationship with the 208 Water Quality Management Plan relative to whether or not this consumptive use of water would further violate the State's water quality standards.

Response: The "violation" of the State's water quality standards in Emery, Carbon, and Grande Counties referred to in the "208" study deals in almost every case with natural causes. Hence, the water quality parameters at times being in excess of recommended values did not constitute a "violation" in the sense of a water user causing deterioration of water quality.

The proposed power generating units would not modify these natural occurrences. The primary impact of converting irrigation water to power generation would be to reduce the amount of land irrigated, and thus reduce the tons of salt carried from the irrigated land into the Colorado drainage, as documented in the SEAOG 208 report.

(2) Comment: Page 1-28 - The table on this page shows a Utah Power and Light Company requirement of Emery Project water for 3,000 acre-feet, representing water taken from current agricultural use and converted to industrial use; however, the requirement for Emery Project water for this action is currently up to 4,000 acre-feet. This fact should therefore be reflected in the final statement since this document will be used as the NEPA compliance basis for amending the contract among Emery Water Conservancy District, Utah Power and Light Company, and the Bureau of Reclamation.

Response: The table has been changed to read 4,000 acre-feet of Emery Project water.

(3) Comment: ...It should be stated in the document under "Impacts" how much agricultural land would be taken out of production by the depletion of Emery water. This is the primary effect this action would have on Bureau of Reclamation projects. The only value for this currently given in the statement is 3,415 acres of productive land removed by the loss of the total 14,000 acre-feet of water required for this action.

Response: The State Engineer of Utah has established the duty of 3.9 acre-feet of irrigation water per acre. If the 6,000 acre-feet of project water were the only source of irrigation water, about 1,500 acres of farm land would be taken out of production. However, project water is only a supplemental supply. The farmers may have primary water which could be used for irrigation and produce a partial crop.

(4) Comment: Page 1-53 - It is unclear from the discussion of the Desert Lake Waterfowl Management Area as to the impact the proposed action would have on this area, especially if Utah Power and Light Company's requirement for Emery County water increased at some later date. This would cause a greater depletion of existing irrigation return flows to Desert Lake and thus reduce its total water supply. An additional comment on this page concerns the Hansen Study of water supplies in Desert Lake. It is not clear as to whether or not the 4 to 10 percent reduction is referring to total water supply. If this is the case, then the effect of this reduction on Desert Lake should be stated.

Response: Utah Power and Light Company has obtained only 200 acre-feet of project water from the Desert Lake drainage. The maximum depletion to the Lake would be 28 acre-feet annually. However, whatever water rights exist for Desert Lake would not be adversely affected.

(5) Comment: Page 1-57. The third paragraph on this page indicates that the date of the final environmental statement is scheduled for October 1986. This should be deleted as the date has not been set.

Response: The section has been changed to reflect this.

(6) Comment: Page 2-12. The current status of fisheries on the project-affected portions of Cottonwood, Ferron, and Huntington Creeks is not clear in this table. The effect of existing water diversions on the current fishery status of these streams should also be stated.

Response: The second paragraph of the Aquatic section gives the status of streams below canyon mouths. It is in these areas of reduced game fish habitat that the project would remove water. Currently used irrigation water diversions on Cottonwood Creek, the proposed water source for the project, are above project proposed water diversions. No game fish habitat exists below these current diversions. Text has been changed.

(7) Comment: Page 3-10. An analysis of impacts on water quality from the conversion of irrigation water to industrial use has apparently not been included in applicable parts of Chapters 3, 5, or 8. Impacts on salinity within the San Rafael, Green, and Colorado Rivers should be addressed. Trace elements and pollutants from sanitary wastes should also be considered. There is a need to clarify the reasoning given for the flow reduction in the Colorado River being only half of the flow reduction in the San Rafael River.

Response: The reduction of irrigated acres would have the primary impact of an annual reduction of 4.1 tons of salt for each acre not irrigated, as stated on page 3-10. This would reduce the salt load downstream in the San Rafael, Green, and Colorado Rivers.

Trace elements and pollutants from sanitary wastes would be diverted into ponds for total containment. On a trial basis, wastes would be diverted to an adjacent farmland with essentially no return flow to the adjacent streams.

Flow reduction in the Colorado River is stated at half of the change of inflow because of the evapotranspiration in the Colorado system, based upon the study by Iorns, 1965. The changes in the San Rafael are due to a combination of evapotranspiration, undefined inflow, and possible leakage into underlying aquifers. The magnitudes of these interacting flows have not been determined. Also, no large reservoir exists on the San Rafael. The reduction from 14,000 acre-feet to 7,700 acre-feet is a result of evapotranspiration on the irrigated lands above the San Rafael River.

(8) Comment: The discussion of impacts on aquatic resources should include how the diversion of additional water from Cottonwood and Ferron Creeks would affect the natural and stocked fisheries on these streams. It is unclear as to why there apparently is no impact on these fisheries caused by the additional water diversions.

Response: No discussion on impacts to fisheries on Cottonwood and Ferron creeks were identified, because the interdisciplinary team determined no major impacts would occur. Proposed diversions are below present irrigation diversions and are thus located on sections of stream presently dewatered much of the year. If any impact does occur, it would be to provide a more stable stream flow between present diversions and the proposed diversions.

(9) Comment: Page 3-12. The discussion of the impacts on waterfowl around Utah Lake should include information about the possible hazard involved with birds flying into transmission lines, especially in a marshland area such

as this where many water-oriented birds exist whose behavioral patterns may include feeding migrations to other areas in the valley. This and other flight-related behavior could result in an undetermined loss of birds caused by collision with the transmission lines.

Response: The interdisciplinary team agreed that the stringing of the second circuit on double circuit transmission line towers would cause a minimal increase in flight hazards to waterfowl. No additional towers would be needed and additional lines would be parallel to the existing lines, constructed in 1978 for Emery Unit 1, located on the opposite sides of the towers. Marsh associated birds which have adjusted behavioral patterns to avoid the towers and present lines should have no trouble avoiding the second lines on the same level and only a few feet apart from existing lines.

(10) Comment: An additional comment on this page concerns the discussion of impacts on the peregrine falcon in the Utah Lake area. This is written as if these birds are actively utilizing this area at the present time. It should be noted, however, that there is presently no active use of nesting areas by falcons in the Wasatch Front area around the lake, although they may occasionally pass through the area.

Response: There are no active peregrine eyries known to exist in the vicinity of Utah Lake, but observations have been made in recent years which would suggest that the area is utilized at times by transient birds.

(11) Comment: Page 8-4. The method utilized to obtain water under each alternative should be described and water quality impacts should be analyzed for each one.

The word "would" under the discussion of water source for the Nephi alternative site should be changed to "could".

Response: Green River and Wellington - The withdrawal of 16,000 acre-feet per year from the Green River would reduce the flow by a maximum of 5 percent, as indicated on page 8-38. The water quality of the Green River would not be affected.

Nephi - Diversion of 16,000 acre-feet per year from the Bonneville Unit of the Central Utah Project into the Sevier River Drainage, south of Nephi, would reduce the salinity of the lower Sevier River.

The word "would" is retained as this is the proposed water source.

Letter No. 8, Evan O. Elan

Comment: (Summarized) Mr. Elan indicated that he was opposed to the project. No comment was made concerning the adequacy of the ES and therefore, no response is required.

Letter No. 9, Glen T. Bean, National Park Service (Supplement)

(1) Comment: The statement in Mr. Isenogle's memorandum of November 8 (letter No. 2 in the appendix) that "It is apparent from the data that (there is) the lack of scrubber. . . ." is enhanced by the following: If Utah Power and Light Company is allowed to operate Units 1 and 2 without 80 percent SO_2 control, the source should be considered a modified source and is subject to the PSD regulation. If this is the case, Units 1 and 2 would be considered to

consume part of the PSD increment rather than being included only as contributing to background concentrations. The environmental statement should indicate that Units 1 and 2 will have 80 percent control. Table 2-1 should show concentrations estimates based on the appropriate emission rates.

Response: The text has been revised and additional monitoring data and modeling analysis included in Chapter 2 to reflect the existing air quality in the area. It is assumed that Emery 1 and 2 would operate with scrubbers and in fact, Emery 1 is now operating with 80 percent SO_2 scrubbing and the scrubber for Emery 2 has been ordered and will be installed.

(2) Comment: The last paragraph in our March 26 memorandum is amplified by the following: It should be pointed out that from the Bureau of Land Management (BLM) visibility monitoring station at Cedar Mountain, east-southeast of the plant site, that visibility degradation from the existing Units 1 and 2 has been observed frequently. It should also be pointed out that one of the major causes of visibility degradation, nitrogen dioxide, would be emitted at a rate of 70 tons/day from the proposed Units 3 and 4. Therefore, it is extremely important that the potential impact on visibility be thoroughly analyzed in the final environmental statement. The analysis should not be limited to a consideration of visual range but should include other visibility-related factors such as chromaticity, brightness, luminance, contrast, texture, and haze and how each changes when subjected to the emissions from the new units and how this may relate to visual alteration of landform characteristics. This analysis should be correlated with the more-than-a-year's data on visibility from the BLM Cedar Mountain monitoring station.

The Cedar Mountan visibility measurements include data which was taken while Units 1 and 2 were operating without SO_2 controls. The effect this has on the analysis is uncertain but should be clarified.

Response: The BLM/NOAA/EPA Cedar Mountain visibility study began in November, 1976. During the measurement period of the study, Emery Unit 1 became operational. Unit 2 is still under construction and has not begun operation. The relative contribution of anthropogenic (including Emery 1) versus natural aerosol sources to the measured visual range variability has not been fully determined and awaits complete analysis of the Cedar Mountain visual range, meteorology and aerosol characteristics data. The study report is expected in September, 1979.

Yellow discoloration from the Emery 1 plume has been observed by the BLM and NOAA Cedar Mountain study participants since Emery 1 began operation and this has been noted in the ES. The intensity, frequency of occurrence and areal extent of the discoloration have not been quantified, but it is assumed that each could increase with additional units, assuming proportional increases in NOx emissions. The yellow discoloration would be an aesthetic intrusion of varying degree depending upon its intensity and extent.

Modeling analyses by H.E. Cramer Co. of atmospheric discoloration and potential impacts to visual range in the surrounding Class I areas and other areas of interest are discussed in the final ES. These modeling studies have included available measurement data from the Cedar Mountain study.

In theory, it would be desirable to consider chromaticity, brightness, luminance, contrast, texture, and haze. However, considering the state of the art at the time the modeling study was designed and the available supporting measurement data, it was determined by BLM and Cramer that the study should be limited to visual range and atmospheric discoloration impacts.

Even this approach required simplifying assumptions and limiting cases because of the uncertainties involved. The results of the study, as well as recognition of the simplifying assumptions and limiting cases studied are summarized in the ES. The full study by Cramer has been provided to the National Park Service.

It is also recognized in the final ES that the determination of the significance of the impacts to visibility in Class I areas will depend upon regulations yet to be promulgated by EPA and the position of the federal land manager charged with the direct responsibility for management of the affected Class I area, and the State of Utah implementation of visibility regulations.

Letter No. 10, William W. Lindsay, Federal Energy Regulatory Commission

(1) Comment: According to the draft environmental statement, the flow in the Colorado River, measured at Lee's Ferry, could be reduced by about 3,850 acre-feet per year as a result of the proposed operation of units 3 and 4. This would have the effect of reducing generation at the downstream main-stem Colorado River hydroelectric projects by about 3,300,000 kilowatt-hours annually. This is equivalent to about 1,600 tons of coal or 5,700 barrels of oil annually, either of which would engender long-term losses in terms of irreplaceable fuel resources and subsequent environmental degradation. Potential loss of hydroelectric generation and its effects should be identified in the environmental statement.

Response: The potential loss of water to the downstream main-stem Colorado River hydroelectric projects would be the equivalent of 1,600 tons of coal used by Emery 3 and 4 during an average five-hour run. The loss of five hours of electical generating time is considered insignificant as compared to the amount produced from coal using the 3,850 acre-feet of water per year, and therefore not identified as a long-term loss in the statement.

Letter No. 11, Kent Briggs, Planning Coordinator, State of Utah

Comment: Since the Forest Service's Roadless Area Review and Evaluation (RARE II) process is complete and no wilderness or further planning recommendations were made within the influence zone and all other RARE II areas are being released from wilderness consideration as of April 15, 1979, all references to RARE II areas should be deleted from the final environmental statement.

Response: Where applicable, the following statement has been inserted: "The Roadless Area Review and Evaluation (RARE II) Final Environmental Statement recommended all roadless areas within the influence zone be returned to multiple use management."

(2) Comment: The document should point out that by overlapping the construction of Units 2 and 3, the work force would be stabilized; thus, the impact would be decreased because of the lack of a boom-bust type cycle.

Response: Refer to response to Comment No. 11 from Mr. Rue Ware.

(3) Comment: Page 1-53, Paragraph 12. The literature reference (Hansen, 1979) should be changed to Vaughn Hansen Associates, 1978, so it will agree with the "Literature Cited" section for reference purposes.

Response: Agree: "Reference Cited" section will agree with text citation.

(4) Comment: Page 1-53, Paragraph 12. Additionally, reduction of return flow waters to the Desert Lake Wildlife Management Area would range from 39 to 61 percent and not 4 to 10 percent. These higher and more significant calculations were made from data in the above-referenced report. The draft environmental statement should identify that the concern is for return flow waters, and other sources of flow will not be affected.

Response: Vaughn Hansen Associates in its April, 1978 report, entitled "Selected Impacts Resulting From Power Water Diversion From San Rafael River Basin" concludes on page 44, "Of the 22,700 acre-feet of irrigation water which are annually applied to Desert Lake Basin, only 3,210 acre-feet, or 14 percent, reaches the lake area each year. Thus, for each 1,000 acre-feet of irrigation water used for power production, 140 acre-feet less will annually flow into the management area." Further, only 200 acre-feet of irrigation water was relinquished to Utah Power and Light Company from Desert Lake drainage. Thus the maximum depletion of water to Desert Lake would be 28 acre-feet.

(5) Comment: Page 1-66, Table 1-12. This table indicates that the Utah Division of State Lands would need to grant a 130-foot right-of-way across six miles of State-owned land. This figure would appear to be an error. If the new 345-kV transmission line is to follow the existing 345-kV line, then the length of the right-of-way would probably be closer to eight miles rather than six.

Response: The data in the report was derived by plotting the centerline of the power transmission corridor on USGS maps. The length of ownership may vary slightly from the stated amount; however, the identified impacts would not differ.

(6) Comment: Page 2-11, Paragragh 4. Moose were released in 1973, 1974, and 1978.

Response: The text has been corrected.

(7) Comment: Page 2-11, Paragraph 5. A transplant of twelve desert bighorn sheep into the San Rafael area was accomplished during December 1978. As a result, desert bighorn sheep will be limited in distribution by their habitat, but will not be uncommon.

Response: The text has been revised.

(8) Comment: Page 2-12, Table 2-3. Willow Lake is stocked with fingerling brook trout and catchable rainbow trout. It does not receive rainbow fingerlings. Also, Academy Mill is stocked with only brook trout fingerlings. It does not receive catchable rainbow trout.

Response: The table has been revised.

(9) Comment: The statement is made that "The State Division of Lands manages Utah State land in the area without land use management plans or programs." This statement is in error as the Division of State Lands does have programs and management plans upon which the state-owned lands are managed.

Response: The environmental statement may be in error. However, subsequent contact with the State Planning Coordinators Office and the Department of Natural Resources have failed to locate the referenced plans.

The state does have policy and regulations for managing these lands, but these have as major goals the use of these land for maximum economic gain.

(10) Comment: There is no reference to the Southeastern Utah Association of Government's planning function, although it is the contact agent for a number of State and federal agencies in this area.

Response: The Southeastern Utah Association of Governments is recognized as experts in planning and has been consulted frequently during the preparation of the Draft. Only Federal, State, and Local government agencies with direct management authority are mentioned.

(11) Comment: The cost-of-living opinions expressed by the author are not based on solid analysis data. Studies done by a variety of agencies within Southeastern Utah and at different times indicate that the statements made herein are inaccurate.

Response: Contact with both the Utah State Planning Coordinators Office and the Southeastern Utah Association of Governments (SEUAOG) have failed to locate the studies referenced in the comment. In light of this lack of substantive data on the subject, representatives from SEUAOG were contacted for further information. The cost-of-living section has been modified to reflect this new information.

(12) Comment: Page 2-36. The description of the traffic environment is significantly underplayed. This area is one of the most significantly impacted areas in the State due to increased truck traffic associated with coal development. We suggest that this area of the text be strengthened with additional facts and information concerning future impacts of increased traffic on the road systems.

Response: The present truck traffic is the result of industrial development in Carbon and Emery counties. The roads in the area have deteriorated from heavy truck traffic. In the future these roads would be repaired by Utah Department of Transportation, but there will be a time lag due to programming and budgeting. This section of the statement deals only with the present environment. Future impacts of increased traffic on road systems is described in Chapter 3 and 5.

(13) Comment: Page 2-37. The impact on agriculture is understated. With the rising costs of water and the competition for water between energy development and agricultural needs, this impact needs further analysis.

Response: The section "Probable Future Environment of the Project Area Without the Proposal" serves only to identify the issues known to exist and does not analyze them in detail. Future impacts to agriculture are more fully explained in Chapters 3 and 6.

(14) Comment: Page 2-38, Paragraph 3. Wildlife violations increased 235 percent between 1972 (137 violations) and 1977 (459 violations). The increase in human population for this same period is estimated to have been 37 percent.

Response: It is true that wildlife violations are increasing faster than population increase would indicate that it should. The reason for this is unknown. It is also unknown if this trend will continue in the future.

(15) Comment: 3-8, Geology and Topography. The impact on watershed and aquifers, which is referred to in later sections of this volume, should also be included in any reference to subsidence.

Response: The subsidence effect is properly placed as a primary impact on topography. The secondary effects of subsidence on watershed and aquifers are properly placed in the water resources sections. This method of tracing impacts is described in the introduction to Chapter 3 (page 3-1) which states . . . "each impact was traced from one environmental component to another."

(16) Comment: Page 3-12. Illegal Collecting and Vandalism - We feel that the present problem caused by existing growth should be described under this section. The illusion that increased population will produce increased losses solely due to Units 3 and 4 is misleading, and the reference of "could" occur is more appropriate than "would" occur.

Response. This section of the statement does not deal with present problems caused by existing growth, but analyzes impacts from the proposal. Vandalism to the cultural and paleontological resources known to exist in the influence zone would increase as a result of the increased population and new access brought about by the proposal.

(17) Comment: (3-12) Threatened and Endangered, Paragraph 1. The last word "uncommon" should be changed to "extremely rare".

Response: The bald eagle is not extremely rare, though the peregrine falcon may be. The important consideration is that both are endangered as defined by the law. The words "uncommon" or "extremely rare" do not carry legal meaning.

The increase in human activity could contribute to additional shooting and harassment of bald eagles and peregrine falcons within the influence zone. Loss of any individual peregrine falcon or bald eagle would be important and a detriment to the continued existence of these species.

(18) Comment: Page 3-15, Transportation Systems. The assumption that the increased traffic would accelerate road damage is only true if there is no rail transportation system. Since other planning documents of the state clearly have identified rail as an alternative and since there are outstanding applications with other agencies of the federal government for rail permits (by at least two interested parties), this comment must be clarified in the context of possible rail service in the future. In fact, Emery Units 3 and 4 may themselves be a contributing factor of whether rail service comes into the county.

Response: The impacts discussed in Chapter 3 are related only to the existing environment. No rail transportation system now exists or would likely exist by the time Units 3 and 4 would be put on line. A rail system is not a realistic alternative to move coal to the Emery plant site from the proposed coal source.

(19) Comment: Page 3-17, Table 3-10. Rather than comment on each individual figure on this Table, we will make a general comment that the numbers related to population are completely out of context. The Utah Population Work Committee's preliminary estimate for July, 1978, was 21,300 for Carbon County. (This Committee is the recognized authority for projections for the State and its sub-districts.) This Table would suggest that between the July, 1978 estimate and 1980, the population will only be increased to 22,490. Such a small increase is not in the context of the last seven year's growth. Similar disparities in the Emery County totals would lead one to believe that estimates based on the fallacious numbers would mean that the 1980 estimates will have little, if any, validity with or without Emery Units 3 and 4.

Response: Our projections are based upon projections developed using the Economic Demographic Model of Carbon and Emery counties developed by Dr. Martin J. Wistisen, Consulting Economist, Brigham Young University, to evaluate growth in Carbon and Emery counties. Since the last census occurred in 1970, there are bound to be large differences between population estimates and models.

(20) Comment: Page 3-19. The cost-of-living data, which has been cited, should carry the caveat that the increase of 1973-76 and 1976-85 are without impacts from Emery 3 and 4. The presumption that 3 and 4 will only cause minimal increases to the existing impacts is somewhat naive, since the existing houses and business services will be further impacted by 3 and 4 in that they are not being built in a previously-stable economic environment.

Response: Suggested changes have been made.

(21) Comment: Page 3-26, Tax Base. Significant fiscal problems already exist in Southeastern Utah due to the impact from existing power plants. The statement that the need for increased community services due to 3 and 4 "could be expected" is misleading, since such needs already exist. The capacity of the infrastructures is already being overtaxed in the county. The tax-base issue is one that is not only germane, but underlies most strategies for this and other projects and, as such, should be dealt with in greater detail. The so-called "crisis" that is created by the need for services preceding the development of a tax base to provide them is always serious in an area of significant growth.

Response: The text in both chapters 2 and 3 has been changed to indicate the present fiscal strain being placed on local governments to provide services to residents. However, discussions with SEUAOG personnel have indicated that while these demands have strained the financial capabilities of the local governments, "crisis" proportions have not occurred, nor are they expected to do so.

(22) Comment: Page 4-2, Table 4-1. The Table should include considerations of period of concern for moose and sage grouse: moose winter range, December 1 through May 15, moose calving area, May 16 through July 15; sage grouse strutting grounds and a two-mile radius, March 15 to June 1.

Response: The sage grouse strutting grounds and moose calving and winter ranges are located on private land. Mitigating measures as outlined in Chapter four are only those committed and enforceable by federal agencies. Those measures cannot be guaranteed on private land by BLM.

(23) Comment: Page 4-3, Paragraph 3. Deer and elk move into winter ranges about November 1 and remain as long as May 15 each year. During even mild winters, these animals lose weight on winter range forage. During the winter period, harassment or other disturbances cause these animals to unnecessarily utilize their energy reserves for escape purposes. The effects of this activity and wasted energy are measurable as physical problems, since green, succulent forage causes scours in some animals. Therefore, protection on winter ranges is needed between November 1 and May 15. During such years, protection need only be provided when the animals are actually on winter ranges.

Response: The statement allows for protection on elk and deer winter ranges from November 1 to May 30. The extra 15 days will allow for additional protection if it is needed.

(24) Comment: Page 5-3, Threatened and Endangered, Paragraph 1. The phrase "not common" does not portray the rarity of these birds adequately. Change "not common" to "extremely rare".

Response: The phrase "not common" has been deleted.

(25) Comment: Page 5-5, Income and Employment. Persons on fixed incomes not only would have difficulties with reduced buying power, but have serious and growing problems in housing and services. Fixed-income residents (including many widows and single-parent families) in existing boom conditions are creating, at times, crisis demands on Social Services, religious, and public welfare agencies. This is a serious consideration with broad impact that needs to be dealt with in detail in the environmental statement.

Response: We recognize the issue and this information has been added to Chapter 3, Quality of Life, Social Well Being in the environmental statement.

(26) Comment: Page 5-6. Again, traffic seems to be downplayed because of lack of data. In fact, significant studies have been done by the Utah Department of Transportation and the Southeastern Association of Governments. Most important is the omission of references to the increase of non-industrial traffic on U-10 as the communities balloon and for which it is the primary artery. Additionally, U-10 funnels the traffic into the rapidly growing market center of Carbon County. Some larger commentary on the road conditions of U-10 over the last several years should have been included.

Response: We do not have detailed data concerning road condition on U-10.

In a meeting on April 10, 1979 with the state safety studies engineer, we were told UDOT was not aware of the unnamed study. The engineer also called other Divisions of UDOT who were not aware of such a study. We also called the Southeastern Association of Governments with similar results.

(27) Comment: Appendixes VIII-3 and VIII-4. The profiles on the Green River Site Transmission Line and the Green River Water Pipeline lists the Utah Prairie dog as inhabiting the Buckhorn Flat area. This is incorrect as the Utah prairie dog is an endangered species not found in this area. The prairie

dog inhabiting Buckhorn Flat is the white-tailed prairie dog which in in no danger of extinction. Possibly, the reason the prairie dog is placed on the profile is because of the association between prairie dogs and the black-footed ferret, which is endangered. Black-footed ferrets could possibly inhabit the white-tailed prairie dog colonies on Buckhorn Flat.

Response: The profiles have been revised according to the comment.

Letter No. 12, William C. White, U.S. Fish and Wildlife Service

(1) Comment: Page 1-53: Desert Lake Waterfowl Management Area. Paragraph 3. Recent information regarding potential depletions to Desert Lake WMA indicates a much smaller amount than the 4-10 percent reduction presented here.

Response: Utah Power and Light Company has only obtained relinquishment of 200 acre-feet of irrigation water from the Desert Lake drainage. The Desert Lake water supply would be depleted by 28 acre-feet annually, if all the water Utah Power and Light obtained were comsumptively used and no provision were made to replace return flow from Desert Lake drainage. This reduction falls within the 4-10 percent figure indicated.

(2) Comment: Threatened and Endangered Species--Paragraph 6. Pursuant to Section 7 of the Endangered Species Act of 1973, our service transmitted to your State Director an official "Biological Opinion" for Emery Units 3 and 4 on December 15, 1978 (copy attached).

Response: The statement has been corrected to reflect that the biological opinion from the U.S. Fish and Wildlife Service has been received. A copy of the opinion has been attached as letter No. 1 in Chapter 9.

(3) Comment: Chapter 5: Adverse Impacts Which Cannot Be Avoided . . . In chapter 3 (Environmental Impacts) you identify a reduction in pheasant habitat of 7.4 percent. We find no mitigation measures to offset this loss nor is it mentioned under adverse impacts. Clarification is needed here.

Response: A discussion of the 7.4 percent reduction in pheasant habitat can be found in the seventh paragraph of Animal Life in Chapter 5. There is no real, committed, or enforceable mitigation available.

Letter No. 13, Soil Conservation Service, George D. McMillan

(1) Comment: One additional problem could be significant. When the irrigation water supply is removed from farmland, serious erosion problems can develop unless permanent vegetation adapted to low rainfall areas is re-established before the water supply is gone.

Response: Though Utah Power and Light Company would use about 14,000 acres-feet of water annually, they have purchased about 21,000 acre-feet of rights. On an average year, about 1/3 of the water would be available to be used back on the agricultural land. On wet years, more would be available. Only during periods of extreme drought (2 dry years back to back) would all the water be used. It is estimated that this would be expected to occur only once during the life of the project. Though the worst case condition is evaluated in terms of agricultural loss, it is not expected that the soils would be denuded to the point of creating an erosion hazard.

Letters No. 14 through 33, Elk Springs Property Users

Comments in these 20 letters showed concern for the possible damage to recreational property owned by these people in the vicinity of Elk Springs. The response to the general comment No. 1 at the beginning of this section answers these concerns.

Letter No. 34, R. D. Davis, Utah Power and Light

(1) Comment: Page 1-40, Ambient Air Quality Monitoring. Add: A permanent air quality monitoring station has been established about 3 miles southwest of the plant measuring SO_2, NOx wind speed and direction. An SO_2 monitor has been established near the entrance to the plant adjacent to U-10.

Response: The information presented in the comment has been added to the statement.

(2) Comment: Page 2-13, second line under Threatened and Endangered Wildlife: Now reads: ". . . . only known endangered animals in the area." Should read: ". . . . only known endangered animals or bitds [sic] in the area."

Response: "Animals" is a category which includes mammals, birds, fish, insects, etc. The sentence is correct as it appears.

(3) Comment: Page 3-8, first line under Geology and Topography: Now reads: "Subsidence would be expected to occur. . . . ." Should read: "Subsidence could . . . ." We have encountered those who take this statement as fact that subsidence will occur, not that it may occur, depending geological structure above the coal seam being mined, and depth of over burden over the seam.

Response: The USGS has indicated that with the proposed 50 percent removal of coal subsidence would occur (Moffit, 1979). Subsidence has occurred over other mines in the Carbon-Emery County Area. The amount of subsidence is unknown, but subsidence would be expected.

(4) Comment: Page 3-10, first line under Terrestial Wildlife: Now reads: "Increase in human population would contribute to the loss and harassment . . . . ." Should read: "Increase in human population would contribute to the increased loss and harassment . . . . ."

Response: The sentence has been changed as suggested.

(5) Comment: Page 3-15, last sentence in 2nd paragraph under Transportation systems: The sentence now reads: "If the development of this portal is not coordinated with these agencies, it could preclude the development of coal and other resources up canyon by blocking access to those resources.

Utah Power & Light has proposed on page 1-19 in the DES to construct a 24 foot wide paved road to the Cottonwood portal, which is a major upgrading of the present county and USFS road up Cottonwood Canyon, thereby providing much improved access to the mining area and to the canyon above the mine. I suggest the sentence on page 3-15 relate more closely to the proposed access as described on page 1-19, or more clearly relate to what access is being blocked.

Page 5-5, last sentence in 2nd paragraph under Transportation Systems: See comments made for page 3-15.

Response: The reference to blocking of access to other resources has been deleted.

(6) Comment: Page 7-2 Water Resources. Under flow changes in springs and seeps caused by subsidence; the loss of water from the springs and seeps would be irreversible but not necessarily irretrievable as the water will not be lost and will reappear at another location.

Response: Natural flow of water would be irretrievably lost at certain locations. Even though water at these sites could be replaced by artificial means, it is not likely to be replaced in perpetuity.

(7) Comment: Page 8-8, Figure 8-3. The location of the Wellington Plant site is wrong, see proper location is on the attached copy of figure 8-3.

Response: Figure 8-3 has been redrafted to show the proper Wellington Site location.

(8) Comment: Page 8-49, second sentence under 500 kV lines: Now reads: "System reliability would be somewhat reduced, since the loss of the line . . . . "

Should read: "System reliability would be considerably reduced, since the loss of the line . . . ."

If a 500 kV line was installed to replace the two 345 kV lines, and the 500 kV line was lost, this loss would result in a probable system instability, whereas the loss of one 345 kV line would result in continued stable operation of the system.

Response: The sentence has been changed as suggested.

(9) Comment: Page 8-49, 500 kV line. The alternate proposed route for a 500 kV line would be parallel to the present Manti Top 345 kV line.

Response: The sentence has been changed as suggested.

(10) Comment: Page 8-63 Existing Environment, 2nd line. Now reads: "Marshalling area in the mouth of Cottonwood Canyon . . . ." Should read: "Marshalling area near the junction of the Wilberg coal haul road and U-29. . ."

Response: The sentence has been changed as suggested.

(11) Comment: Page 9-1, History of Consultation and Coordination, 1st line Now reads: "On April 18, 1978, a meeting was held . . . ." Should read: "On April 18, 1977, a meeting was held. . . ."

Response: The sentence has been changed as suggested.

Letter No. 35, P. M. Rees, U.S. Forest Service

(1) Comment: Numerous discussions and communications between agencies and Utah Power and Light Company (UP&L) have stressed the need to double circuit the proposed transmission line through the Spanish Fork Canyon corridor. In chapter 1, pages 1-34, paragraph 4, it appears that double circuiting has been adequately addressed. However, the paragraph only commits UP&L to the enlargement of the foundations on the tangent towers. This does not satisfy our needs or concerns. We have rewritten this paragraph on the enclosure.

> "A 345-kV transmission line for Units 3 and 4 would be constructed parallel to the existing 345-kV line for Unit 1. It would extend from the plant site, through Spanish Fork Canyon, to the Camp Williams substation. Figure 1-19 shows the proposed route including those portions of the lne which would be constructed with single circuit conductor on towers designed to be converted to double circuit use by placing a 24-foot extension on each tower. These so called "piggy back" towers would be installed with enlarged foundations. (Only the tangent structures would be built of "piggy back" design; angle and dead-end structures would be of conventional type design but constructed for easy conversion to double-circuit specifications.) Those portions which would use existing double circuit towers are also shown. Figure 1-20 and 1-21 show structure types."

Response: The paragraph on the enclosure has been used in the FES as suggested.

(2) Comment: Enclosed is a copy of Appendix II-2, page 11, with some corrections. We have attempted to make these minor changes twice before, in both the draft and final of the Emery 1 Environmental Statement. It is important that we convey correct and accurate identification of estimated potential for landslides, erosion hazard, and revegetation potential.

Response: This information has been incorporated in the final graphic (Appendix II-2).

(3) Comment: It is recommended the final statement require construction of a two-lane paved road from the junction of Highway 29, up Cottonwood Canyon, across BLM through the Cottonwood Site, to the Forest boundary. The roadbed subgrade should be of sufficient width for placement of any future pavement structure necessary to provide the final paved width for all future uses. A paved pavement structure to carry the present traffic and proposed mining traffic safely for the design period of the mine should be placed prior to full development of the mine.

Response: A recent study (Warbington, 1978) states that two 11-foot lanes and two 6-foot shoulders are the minimum widths consistent with safety and efficiency on mine haul roads. The road proposed by Utah Power and Light would not be regularly used by UP&L coal trucks or other heavy equipment after construction of the portal facilities. The UP&L proposed road would exceed the coal haul road minimum USFS recommended width by one foot. The recommended shoulder width would not be added to the road for the last one-quarter mile of pavement reducing the width at the point the pavement would end and the dirt road would begin.

Any resource development which would cross private property at the Cottonwood portal would have to be negotiated. Utah Power and Light could allow or refuse crossing of their property, whether or not it is developed. However, it would be possible for both the BLM or USFS to stipulate, as condition to granting the rights-of-way across federal land, reservation of rights-of-way across UP&L owned properties.

(4) Comment: A serious point of concern is the location of the proposed development of the Cottonwood Portal of the Wilberg Mine. The Forest Service requested that two alternative locations be reviewed. These alternatives should be reviewed and included in the final statement. The alternatives are lower in the canyon and would reduce congestion of traffic. It cannot be emphasized too strongly that unless great care in planning is taken, the development of coal and other resources further up the canyon will be impaired or even totally blocked for the life of the portal complex. This point should be stressed throughout this document, and added as a point for mitigation in Chapter 4.

Response: The most logical site for an alternative portal is located about 0.5 miles down canyon from the proposed portal. This is discused in the alternatives section (Chapter 8) as Alternative Mine Portal Site.

(5) Figure 1-10 on page 1-21, Proposed Cottonwood Portal Layout, is inadquate. For example, no dimensions are given, and no cut and fill figures are shown. The location of Trail Mountain Mine Portal with its close proximity to proposed Cottonwood Portal is not shown. Unless careful planning and coordination occur, resources further up the canyon will suffer.

Response: Figure 1-10 has been redrafted with a legend which indicates dimensions and cut and fill areas. The location of the Trail Mountain Mine portal is also shown.

(6) Comment: Figure 1-28 on page 1-58, Interrelated Coal Mining, in the Legend, numbers 15 (Deer Creek Mine) and 16 (Wilberg Mine) are shown to be owned by Peabody Coal Company. These two mines were sold to Utah Power and Light Company by Peabody nearly two years ago.

Response: The legend has been corrected to show ownership by Utah Power and Light Company.

(7) Comment: Page 1-63 lists authorizing action. All of the rights-of-way need to be coordinated into an access and utility corridor.

Response: The maximum possible right-of-way widths were listed on page 1-63. When the lines are actually surveyed and facilities installed, the rights-of-way would overlap; consequently, the full corridor widths would be less than shown on page 1-63.

(8) Comment: Pages 1-27 and 1-24 are confusing as to whether the same corridors or right-of-way width will be used for water, sewer, power, and conveyor. A 100-foot right-of-way appears excessive for a 42-inch conveyor belt, and a 50-foot right-of-way appears narrow for a two-lane paved road. Typical cross sections showing size and placement of the roadway, waterline, sewerline, powerline, and conveyor within the access and utility corridors are needed. The cross sections should be site specific, showing the existing roadway, stream and ground line with respect to the proposed road and utilities. Sufficient cross sections should be provided to allow accurate determination of impacts within the canyon.

Response: Miles and acres shown were calculated using the maximum possible right-of-way width and length as shown in table 1-11 (Federal Authorizing Actions). When the lines are actually surveyed and facilities installed, the rights-of-way would be in a single common corridor and the actual acreage requirement would be less than described in the environmental statement. Utah Power and Light Company was requested to provide site specific cross-sections. These have been forwarded to the U.S. Forest Service.

(9) Comment: Page 1-64 lists an electronics site for communication repeater station. Forty acres appears excessive for this use.

Response: The new radio repeater station would occupy about 2 acres on U.S. Forest Service land. The text has been changed to reflect this.

Letter No. 36, Robert J. Arkins, Heritage Conservation and Recreation Service

(1) Comment: We note (p. 3-12) that "Highly important paleontological remains. . . could be destroyed during construction of the transmission line." We suggest that the final environmental statement discuss any plans which may exist for mitigation of this loss of paleontological remains. If no plans exist, the final statement should provide an expanded discussion of the significance of the expected loss.

Response: Standard requirements for protecting paleontological remains described in Chapter 1 are strict. However, inadvertant loss can still be expected. This loss of paleontological remains identified in Chapter 3 could prove a loss in an important link between the reptile and mammal life forms. The text has not been changed as it is felt these items are sufficiently addressed.

Letter No. 37, Kenneth E. Vanlier, U.S. Geological Survey

(1) Comment: p. 1-16, Coal Supply paragraph 5. The feasibility of longwall mining should be fully evaluated to take advantage of higher extraction ratios and conservation of resources.
p. 5-4, Minerals. See comments on p. 1-16, Coal Supply.

Response: Utah Power and Light Company proposes both the room-and-pillar and long-wall methods for coal extraction as this combination appears to be the most economical method available. A search of the literature and conversations with mining engineers indicate the use of straight long-wall methods would not increase the extraction ratio.

(2) Comment: p. 1-54, Generating Complexes. The proposed Warner Valley and Harry Allen power plants (Southern Utah Coal DES) should be included in this DES as related generating complexes.

Response: We have been unable to identify any interrelationship between these two plants and the Emery plant. The Emery plant does not share a common market or environment (including air quality and socioeconomics) with the Warner Valley and Harry Allen power plants.

(3) Comment: p. 2-6. We believe more detail relating to the "Geology and Topography" section should be added. In discussing the siting of a power plant and transmission lines, a summary of the Bechtel contract report pertaining to the geology, seismology, and foundation materials of the subject lands should be included. As it presently exists, the section is inadequate.

Response: It is beyond the scope of this environmental statement to deal with technical engineering problems. Effects from subsidence are the only effects on geology and topography that can be identified. These are addressed in Chapter 3.

(4) Comment: p. 2-13. The advisory Council on Historic Preservation should be notified of the Utah State Historic Preservation Officer's determination, as required under 36 CFR Part 800.

Response: 36 CFR Part 800 requires that the Advisory Council on Historic Preservation be provided with adequate documentation of a determination of effect, including evidence of the views of the State Historic Preservation Officer, as it applies to properties included in or eligible for inclusion in the National Register of Historic Places. The State Historic Preservation Officer's determination referred to here is one of eligibility rather than effect. Since none of these sites meet National Register eligibility criteria, there is no need to consult or notify the Advisory Council.

(5) Comment: p. 2-21, Wilderness and Roadless Areas. This section should include U.S. Forest Service RARE II final recommendations of January 1979. Most of the RARE II areas affected by this proposal have been recommended for nonwilderness uses.

p. 3-15, Wilderness. See comments on p. 2-21, Wilderness and Roadless Areas.

p. 5-4, Wilderness. See comments on p. 2-21, Wilderness and Roadless Areas.

Response: The draft statement was being printed when the RARE II recommendations were made. The final statement reflects both the RARE II recommendations and the most current BLM wilderness inventory results.

(6) Comment: Chapter 8 Alternatives. Although this chapter contains an adequate discussion of alternative power plant sites, water supplies, coal transportation routes, and others, one set of alternatives is conspicuous in its absence. This is, provided the Emery Units 3 and 4 are approved as proposed, what will be the source of the coal if the proposed Cottonwood portal of the Wilberg Mine is not approved? An in-depth discussion of alternative coal sources, coal transportation routes, coal loadout facilities, and associated impacts and mitigating measures is necessary to complete this chapter, as well as the ES.

Response: No unavoidable adverse impacts to the human environment resulting from the proposed Cottonwood Portal of the Wilberg Mine were identified during impact assessment that would be minimized or eliminated by an alternative portal. Utah Power and Light Company has indicated that, if the Cottonwood Portal were not approved, coal would be purchased on the open market. Nevertheless, an alternative portal site has been evaluated about 0.5 miles down canyon from the proposed portal. This analysis is included in Chapter 8.

(7) Comment: p. 9-3. "Office of Surface Management" should be "Office of Surface Mine, Reclamation, and Enforcement (OSM)."

Response: The correction has been made.

(8) Comment: P. 9-9. The formal consultation process for endangered and/or threatened flora and fauna must be completed prior to approval of the proposed action, such as the American peregrine falcon, bald eagle, Colorado River squawfish, Colorado River humpback chub, black-footed ferret, proposed threatened razorback sucker, proposed endangered bony tail chub, and the "scorpion weed," among others.

Response: A letter has been received from the Fish and Wildlife Service stating their biological opinion. It appears in Chapter 9 as Letter No. 1.

Letter No. 38, A. M. Gabiola, Dept. of Energy, Western Area Power Administration

(Summarized) Mr. Gabiola indicated that the draft appears to be well prepared and sufficiently covers details to adequately determine the environmental impacts. Therefore, no response is required.

Letter No. 39, Alan Merson, Environmental Protection Agency

Comment: Pending completion of data collection and the promulgation of visibility regulations, we have rated the draft ES for Emery Units 3 and 4 as ER-2. This means we have significant reservations regarding the air quality and visibility impacts from the project. Furthermore, we would like to see future additional work be done in cooperation with EPA and the Park Service to help resolve these issues.

Response: The Bureau of Land Management will cooperate fully with the Environmental Protection Agency and the National Park Service to help resolve the issues discussed. Meetings were initiated in August, 1979 and will continue.

COMMENT LETTERS

The following section contains reproductions of comment letters from agencies, private organization, and recognized experts, presented in chronological order in which they were received.

LETTER A

FA/SE/Coop.--Federal--BLM
Emery Units 3 and 4

MEMORANDUM

To: State Director, Bureau of Land Management
Salt Lake City, Utah

From: Regional Director, Region 6, Fish and Wildlife Service
Denver, Colorado (SE)

Subject: Biological Opinion - Emery Units 3 and 4

This is our official response to your request of August 18, 1978, for consultation on Emery Units 3 and 4, near Castle Dale, Utah. Our response was delayed because appropriations for work accomplished under the Endangered Species Act expired on September 30, 1978. Additional funds were not provided for our work until November 10, 1978, when the 1978 Amendments to the Act became law.

Bald eagles winter along sections of the preferred transmission line corridor, primarily along Gordon Creek and in Spanish Fork Canyon. However, no known roost sites are located near the corridor. The transmission line for Emery Units 3 and 4 would run through the same corridor as that for Emery Units 1 and 2, which is now under construction. To reduce impacts to eagles, the lines should be 300 yards or more from the nearest road, except for a minimum number of access points. The greatest impact to bald eagles will be disturbance from construction activities. If disturbance is great enough, bald eagles will go elsewhere to search for food. To avoid disturbing wintering bald eagles, construction should not occur from November to mid-March along Gordon Creek.

Due to extensive human activity in Spanish Fork Canyon, construction of the transmission line should not unduly affect bald eagles if such activity is minimized in the winter. With the above stipulations, it is our biological opinion that Emery Units 3 and 4 are not likely to jeopardize the continued existence of the bald eagle. However, if alternative transmission line corridor routes are used, consultation must be reinitiated. Known winter roost sites exist along alternative routes and could be adversely affected by construction.

Water to cool the generators or Units 3 and 4 will be purchased from irrigators in the San Rafael River Basin. If this water is used, irrigation return flow to the San Rafael River will decrease by about 7,700 acre-feet per year. This is 10 percent of the total annual flow. Much of this water is either reused or it evaporates before reaching the Green River. The impact in the Green River will be small, but cannot be predicted accurately. At Lee's Ferry, the flow of the Colorado River would decrease by about 3,850 acre-feet per year or 0.03 percent of total annual flow, as a result of the preferred alternative. Because this alternative proposes to use water presently used for irrigation, it is our biological opinion that the proposed use of irrigation water in the San Rafael River for Emery Units 3 and 4 is not likely to directly jeopardize the continued existence of the Colorado squawfish or the humpback chub.

However, the Fish and Wildlife Service is very concerned about the cumulative impacts of the many water development projects in the Colorado River Basin on endangered fishes. We have initiated several studies to determine habitat requirements of the endangered fishes, with the primary objective of establishing minimum streamflow for the major rivers of the basin (Green, Yampa, Duchesne, White, and Colorado Rivers). All future water diversions and reservoirs should be considered cumulatively. Minimum streamflows must be establihsed before the total impacts of all projects can be effectively analyzed.

An endangered plant species, Phacelia argillacea, was listed in the Thursday, September 28, 1978, Federal Register (Vol. 43, No. 189). This listing occurred after the formal consultation process began on August 30, 1978. Procedures set forth in the Interagency Cooperation Regulations, January 4, 1978, Federal Register, states that consultation must be reinitiated when a new species is listed which may be affected by an activity or program.

On November 30, 1978, an examination was made in Spanish Fork Canyon to determine if a serious conflict exists between the proposed transmission line and the listed plant species. It has been determined that the transmission line for the Emery Units 3 and 4 project will not enter the critical habitat of the only known site of Phacelia argillacea in Spanish Fork Canyon. The Bureau of Land Management has indicated that the final environmental impact statement will stipulate that a competent botanist be present to survey the transmission corridor during the construction phase in the event that additional populations of the species exist.

It is our biological opinion that Emery Units 3 and 4 will not jeopardize the continued existence of Phacelia argillacea nor threaten its critical habitat. This completes the formal consultation process for the proposed project. If additional en-

LETTER A (CONTINUED)

dangered species are listed or if the conditions of the proposed work change, consultation with the Fish and Wildlife Service must be reinitiated. Thank you for your interest and cooperation in conserving endangered species.

// Harvey Willoughby

bcc: ARD, Environment
Area Manager, Salt Lake City

SE/WWathen:eah:12/12/78

Editor's Note: The copy of the biological opinion received by the interdisciplinary team was not of sufficient quality to print. This is a retyping of that copy. WHB

LETTER B

United States Department of the Interior
NATIONAL PARK SERVICE
UTAH STATE OFFICE
125 S. STATE STREET
SALT LAKE CITY, UTAH 84138

IN REPLY REFER TO:

L24

November 8, 1978

Memorandum

To: Utah State Director, Bureau of Land Management

From: Assistant to the Regional Director, Utah

Subject: Visibility Impacts of Emery Units 3 and 4

We have recently received and reviewed a copy of the H. E. Cramer Company study. The results of that study were disturbing to us as the managers of the three mandatory Class I PSD areas already identified as containing visibility as an important value, which will be impacted by the proposed project. It was disturbing in three aspects.

The first was that there is further thought being given to the continued operation of units 1 and 2 without scrubbers. It was our understanding that BACT required the scrubbers, that they had been purchased, and would be installed upon delivery. It is apparent from the data that the lack of scrubbers on the first two units is even now degrading visibility in the three protected areas.

The second was that judgments have been made, without benefit of the regulations required by the statute, relative to the extent to which visibility should be protected in the few areas designated pursuant to the visibility protection sections of the Clean Air Act. This is especially true when those judgments are that reductions in visual range of 10 to 20 percent could be accommodated without significant adverse effects on visibility. This obviously flys in the face of the intent of the Congress expressed in P.L. 95-95 which is, "Congress hereby declares as a national goal the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas which impairment results from man-made air pollution." The underlining is ours.

The third is that the study assumed that the existing visual range occurs in a pristine environment. It does not. Controlled sources are already impacting visibility in those areas. The study's rationale would have us believe that already dirty air is ample justification for further degradation of visibility in protected areas. This is also clearly the reverse of the intent to remedy any existing impairment of visibility expressed in the statute.

Jim Isenogle
James L. Isenogle

cc:
Regional Director, Rocky Mtn Region
Barbara Brown, WASO
Superintendents, Capitol Reef NP, Canyonlands NP & Arches NP

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

LETTER C (1 of 3)

STATE OF UTAH
Scott M. Matheson, Governor

Michael D. Gallivan
Executive Director
104 State Capitol
Salt Lake City, Utah 84114

June 15, 1978

Mr., Jim Biggins
University Club Building
136 East South Temple
BLM
Salt Lake City, UT 84101

RE: Emery 3 & 4 Memorandum of Understanding

Dear Mr. Biggins:

The staff has reviewed the Memorandum of Understanding, and concurs with the Cooperative Agreement. I have signed the Agreement, and am returning one copy to you. Your proposed means to insure protection of cultural values is acceptable.

Should you have any questions or concerns, please contact Wilson G. Martin, Preservation Development Coordinator, Utah State Historical Society, 307 West 200 South, Salt Lake City, Utah 84101, 533-6017.

Sincerely,

Michael D. Gallivan
Executive Director
and
State Historic Preservation Officer

WGM:jr:B405EM, B469EM

Enclosure

CULTURAL RESOURCES
MEMORANDUM OF UNDERSTANDING
EMERY UNITS 3 & 4 ENVIRONMENTAL STATEMENT

BETWEEN

THE BUREAU OF LAND MANAGEMENT
AND
THE STATE OF UTAH

I. PURPOSE

The Bureau of Land Management, hereinafter referred to as the Bureau, is preparing the Emery Units 3 & 4 Environmental Statement (Emery 3 & 4 ES) under the provisions of the National Environmental Policy Act of 1969. The Bureau has determined that cultural values could be damaged or lost as a result of actions proposed in the Emery 3 & 4 ES. The following kinds of actions are proposed on public lands administered by the Bureau:

a. Non-Bureau Energy Initiative (NBEI) proposals submitted to the Bureau. These include proposals for rights-of-way and other land uses involving the surface of public lands.

b. Major transportation network proposals in connection with power plant operation.

The Utah State Historic Preservation Office, hereinafter referred to as the State, is interested in assuring that cultural values in Utah be protected. The Bureau and the State have consulted and agree as to the measures, outlined in this agreement, which should be undertaken to protect these values should authorization be granted to use public lands in Utah adminsitered by the Bureau for the purpose of any of the above mentioned proposed actions. In this agreement, "cultural resources" means data and sites which have archaeological, historical, architectural, or cultural importance and interest.

Investigators will be qualified to evaluate these "cultural resources." Qualifications of investigators will be submitted to the State Historic Preservation Officer.

II. AUTHORITY

This agreement is authorized under the Federal Land Policy and Management Act of 1976 and the National Historic Preservation Act of 1966. It is in accord with Bureau policies and programs. It does not abrogate nor amend any other agreement between the Bureau and the State.

LETTER C (2 of 3)

III. RESPONSIBILITIES AND PROCEDURES

The Bureau will comply with 36 CFR 800 in identifying sites which are listed in or eligible for inclusion in the National Register of Historic Places.

A. As part of the planning and environmental analysis required prior to any decision to authorize rights-of-way for the proposed Emery 3 & 4 project, the Bureau will search for archaeological and historical literature concerning the Emery 3 & 4 project area. Class II studies (designed sampling inventories) have been conducted on all public lands that would be affected by the Emery 3 & 4 proposal and alternatives.

B. After completing the planning and environmental analysis process, should the proposed management be implemented, the Bureau will inform project participants of, monitor compliance with, and enforce the following stipulations:

1. Prior to initiation of ground-disturbing activities, literature searches and intensive surveys will be undertaken on all areas which would be disturbed.

2. Wherever possible and feasible, cultural resources will be avoided by construction and related activities. This will be accomplished mainly be rerouting linear facilities such as transmission lines, roads, fences, and pipelines, and adjusting locations of other facilities.

3. A professional archaeologist may be required to be present when ground-disturbing operations are underway.

4. Subsurface cultural resources that are encountered during any construction will be salvaged if there is no other recourse in such a situation.

C. Wherever it is not possible and feasible to avoid sites that contain cultural values, the Bureau will consult with the State to determine the most satisfactory means of mitigating damage, as required by 36 CFR 800.

D. The Bureau will provide cultural resources reports, technical reports, and other pertinent material to the State.

E. The State will provide the Bureau with a letter, for use as an exhibit in the Emery 3 & 4 ES, to the effect that the procedures herein proposed by the Bureau, if correctly implemented, will satisfy the State's interest.

IV. The attached list identifies the specific actions that the Bureau anticipates will be included in the Emery 3 & 4 ES. The list may be brought up to date, as necessary, without amending this agreement in any way.

V. IMPLEMENTATION

A. This agreement will become effective on the date of the last signature on this agreement.

B. Either party may request revision or cancellation of this agreement by written notice, not less than 30 days prior to the time when such action is proposed.

C. Any problems resulting from this agreement which cannot be resolved by the Bureau and the State will be referred to the Secretary of the Interior and the Governor of Utah for resolution.

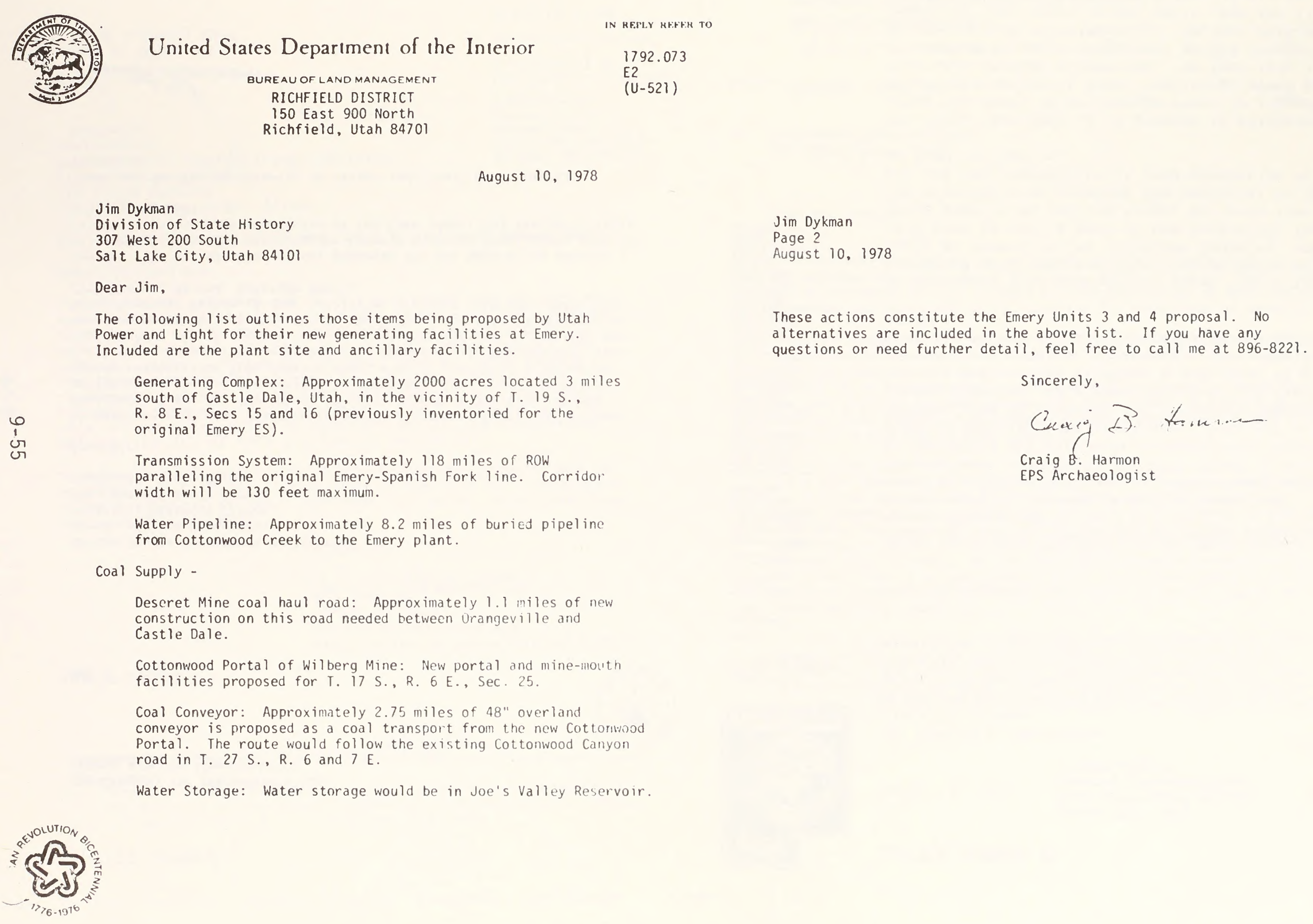
5/10/76
Date:

Gerald E Magnuson
Utah State Director
Bureau of Land Management
Department of the Interior

4/19/75
Date:

Utah State Historic Preservation
Officer

LETTER C (3 of 3)



United States Department of the Interior
BUREAU OF LAND MANAGEMENT
RICHFIELD DISTRICT
150 East 900 North
Richfield, Utah 84701

IN REPLY REFER TO
1792.073
E2
(U-521)

August 10, 1978

Jim Dykman
Division of State History
307 West 200 South
Salt Lake City, Utah 84101

Dear Jim,

The following list outlines those items being proposed by Utah Power and Light for their new generating facilities at Emery. Included are the plant site and ancillary facilities.

Generating Complex: Approximately 2000 acres located 3 miles south of Castle Dale, Utah, in the vicinity of T. 19 S., R. 8 E., Secs 15 and 16 (previously inventoried for the original Emery ES).

Transmission System: Approximately 118 miles of ROW paralleling the original Emery-Spanish Fork line. Corridor width will be 130 feet maximum.

Water Pipeline: Approximately 8.2 miles of buried pipeline from Cottonwood Creek to the Emery plant.

Coal Supply -

Deseret Mine coal haul road: Approximately 1.1 miles of new construction on this road needed between Orangeville and Castle Dale.

Cottonwood Portal of Wilberg Mine: New portal and mine-mouth facilities proposed for T. 17 S., R. 6 E., Sec. 25.

Coal Conveyor: Approximately 2.75 miles of 48" overland conveyor is proposed as a coal transport from the new Cottonwood Portal. The route would follow the existing Cottonwood Canyon road in T. 27 S., R. 6 and 7 E.

Water Storage: Water storage would be in Joe's Valley Reservoir.

Jim Dykman
Page 2
August 10, 1978

These actions constitute the Emery Units 3 and 4 proposal. No alternatives are included in the above list. If you have any questions or need further detail, feel free to call me at 896-8221.

Sincerely,

Craig B. Harmon

Craig B. Harmon
EPS Archaeologist

LETTER NUMBER 1

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

ROCKY MOUNTAIN REGION
10455 EAST 25TH AVENUE
AURORA, COLORADO 80010

MAR 2 1979

United States Department of Interior
Bureau of Land Management
Richfield District Office
150 East 900 North Street
Richfield, Utah 84701

Dear Sir:

We have reviewed your Draft Environmental Statement (DES), Emery Power Plan Units 3 and 4. The impact of this project on aviation related activities appears to be negligible. However, it is possible that during transmission line construction, when in proximity to aviation facilities, an adverse electromagnetic affect on air navigational aids could occur. If it appears that you will encounter this situation and have any questions, please contact the Federal Aviation Administration, Rocky Mountain Region, Airway Facilities Division, ARM-400, 10455 East 25th Avenue, Aurora, Colorado 80010.

The two 600-foot emission stacks proposed for the generating complex will probably require notice under Federal Aviation Regulations Part 77. This will necessitate submission of FAA Form 7460-1 (as stated in Table 1-11 of the DES).

Thank you for the opportunity to review your Draft Environmental Statement.

Sincerely,

for Kenneth Thomasson
FRED H. JAEGER, JR.
Chief, Planning Staff

LETTER NUMBER 2

Utah
Wool Growers

10 WEST 100 SOUTH
SUITE 600
SALT LAKE CITY, UTAH 84101
TELEPHONE 359-3972

OFFICERS

SAM CHOURNOS
Tremonton
President

HATCH HOWARD
Woods Cross
Vice President

CLAIR R. ACORD
Executive Secretary

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MALCOLM YOUNG

March 13, 1979

Mr. Donald L. Pendleton
District Manager
Richfield District Office
Bureau of Land Management
150 East 900 North Street
Richfield, Utah 84701

Dear Mr. Pendleton:

Thank you for your draft Environmental statement Emery units 3 and 4.
I have read the statement and am concerned about the economic impact on some already existing enterprises.
In reviewing the statement it seems that there is more concern about preserving wildlife and it's habitat than to perserve the livestock industry. Apparently there is always the situation that first we take care of the wildlife A.U.M. then if any is left lets consider livestock. This should be reversed as the livestock industy is the backbone of Emery.

If the Emery unit is approved about 10% of the irrigated good land would be without water and again an impact on the livestock industry, granted this area is only a drop in the bucket but these drops seem to be getting larger and more frequent. Too frequently we consider the potential of growth but not the possibility of food production or how we feed the nation.

One other item that is of concern is wilderness and under the study of wilderness there is a tendency by your organization to begin locking up areas as if they were already wilderness. We feel this is not the method in which management should procede.
We are opposed to wilderness. We feel that economic impact on some areas though small take the life blood of a community and some individuals are not able to adjust.

Sincerely,

Clair R. Acord
Executive Secretary

LETTER NUMBER 3

STATE OF UTAH
Scott M. Matheson, Governor
DEPARTMENT OF
DEVELOPMENT SERVICES
J. Phillip Keene III
Executive Director
104 State Capitol
Salt Lake City, Utah 84114
Telephone: (801) 533-5961

March 7, 1979

Chairperson
Environmental Coordinating Committee
State Planning Office
118 State Capitol
Salt Lake City, Utah 84114

RE: Draft Environmental Statement, Emery Units 3 and 4, Emery County

Dear Chairperson:

The staff has reviewed the proposed project and concurs with recommendations/findings. If these procedures are followed, this project will have no known effect upon any potential or listed National Register historical, archeological, or cultural sites. Please be advised, however, that should artifacts or cultural objects be discovered during the construction stage, it is the responsibility of the Federal agency or community receiving block grant funds to notify this office immediately as provided for in the Utah State Antiquities Act of 1973 and Public Law 93-291.

Should you need assistance or clarification, please call or write Wilson G. Martin, Preservation Development Coordinator, State Historical Society, 307 West 200 South, Salt Lake City, Utah 84101, 533-6017.

Sincerely,

Phillip Keene

J. Phillip Keene, III
Executive Director and
State Historic preservation Officer

WGM:pc:C184:EM:E-2

(5) concur with findings/recommendations

cc: Donald L. Pendleton, District Manager, United States Department of the Interior, Bureau of Land Management, Richfield District Office, 150 East 900 North Street, Richfield, Utah 84701

ON OF: INDUSTRIAL PROMOTION · TRAVEL DEVELOPMENT · EXPOSITIONS · STATE HISTORY · FINE ARTS

LETTER NUMBER 4

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

85 So. 1st E. Castle Dale, Utah 84513

2 [illegible] Return 3/9

SUBJECT Comments: Emery 3&4

DATE March 6, 1979
3/12

TO Paul Howard State Director
BLM Office S.L.C. Utah

Dear Mr. Howard:

It seems difficult to me to oppose an energy development in a day and age when the nation is so critically short on energy. Emery County has an abundance of coal, a small but adequate supply of water and an otherwise all round well suited location for these types of developments.

With pressures to develop more energy sources I suppose some sacrifices must be made. It would seem impossible to build a generating plant anywhere and not have an impact on someone or something. I think the key is to minimize those impacts as much as possible, while doing the most good for the most people. In this context of minimizing the impacts while building a necessary facility I would like to make a few comments on your EIS on Emery units 3&4.

I found much difficulty in seperating the added impacts of units 3 & 4 over the already hashed over units 1& 2. It would seem adequate to me if you only handled the additional impacts rather than going over ground covered in the previous EIS. I would be interested to know how many additional acres will be lost and how many additional sources of water will be needed and in what amounts. As you can see I was more confused than informed. If you retire 3415 Acres of farmland is that for units 1 thru 4 or only units 3 & 4 ? This figure amounts to about 7% of our entire irrigated lands. That to me is sad but may be one of those necessary sacrifices.

Also on page 1-30 concerning the fiberglass pipeline for water transportation, your EIS states that the pipe will be placed on a selected rock and sandfill cradle. Our standards require that fine materials with rock no larger than ¼" in diameter be placed next to the pipe. Thank you for the opportunity to review the EIS and express my views.

K. Chad Wilkins
District Conservationist
Soil Conservation Service
Castle Dale, Utah.

LETTER NUMBER 5

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
CENTER FOR DISEASE CONTROL
ATLANTA, GEORGIA 30333
TELEPHONE (404) 633-3311

March 22, 1979

Mr. Donald L. Pendleton
U.S. Department of the Interior
Bureau of Land Management
Richfield District Office
150 East 900 North Street
Richfield, Utah 84701

Dear Mr. Pendleton:

We have reviewed the draft environmental statement on Emery Units 3 and 4 (coal-fired steam-generating units) in Emery County, Utah. We are responding on behalf of the Public Health Service.

The final environmental impact statement should address in more quantitative terms the situation concerning water and sewage facilities. If, in fact, the problem could be alleviated by the mere extension of existing water and sewage lines then this could hardly be classified as an adverse impact. If more extensive alterations or modifications would be required, these alternatives should be addressed in the final environmental statement.

The statement makes mention of trace elements being released into the atmosphere during operation. A more detailed description of these elements and the trace elements contained in the fly ash would be helpful in evaluating the final EIS.

Thank you for the opportunity of reviewing this statement. We would appreciate receiving two copies of the final statement when it is issued.

Sincerely yours,

Frank S. Lisella, Ph.D.
Chief, Environmental Affairs Group
Environmental Health Services Division
Bureau of State Services

LETTER NUMBER 6

United States Department of the Interior
NATIONAL PARK SERVICE
ROCKY MOUNTAIN REGIONAL OFFICE
655 Parfet Street
P.O. Box 25287
Denver, Colorado 80225

IN REPLY REFER TO:
L7621 (RMR)PC

MAR 2 6 1979

Memorandum

To: District Manager, Richfield District Office, Bureau of Land Management, Richfield, Utah

From: Regional Director, Rocky Mountain Region

Subject: Draft environmental statement for proposed construction of generating units 3 and 4 at Utah Power and Light's Emery generating complex near Castle Dale, Utah (DES 79-8)

We have reviewed the subject document and have the following comments.

Page 1-40

Meteorological Monitoring

Meteorological monitoring was done at 10 meters (temperature, humidity, wind speed, and direction) and at 50 meters (wind speed and direction). This appears to us to provide inadequate or limited data on inversion layers in the atmosphere.

Inversion data should be recorded up to and beyond 100 meters. High level inversions in conjunction with stack emissions and other sources of pollution appear to be a primary factor leading to a reduction in visual range at Arches and Canyonlands National Parks.

Ambient Air Quality Monitoring

In conjunction with gathering meteorological data to 100 meters and higher, air quality monitoring should also be conducted to 100 meters and higher. This would provide a more accurate picture of air quality than ground level measurements. Inversions trap pollutants and restrict dispersion at the inversion level, not ground level, and it is inversion conditions that create greatest visibility impairment at our parks.

CONSERVE
AMERICA'S
ENERGY

Save Energy and You Serve America!

LETTER NUMBER 6 (CONTINUED)

The plume dispersion study (due summer 1979) by North American Weather Consultants mentioned on page 1-45 may have addressed the problem we have outlined, but this is not indicated and in any case the results are not in. If the study is relevant to the project, its results should have been discussed in this document. If not relevant, why was it conducted?

The discussion of visibility on page 2-4 gives a median visibility of 65-80 miles then apparently tries to diminish that distance with a statement concerning 70 to 90 percent reduction in visual range under specific conditions. Actually the northern end of Capitol Reef National Park is approximately 45 miles from the Emery Site and well within the median visual range indicated. From that end of the park, the plume can be seen from the power plant and there are occasions when there is atmospheric discoloration noted. We have no reason to believe that this situation would not increase in direct ratio to the amount of pollutants two additional units would create. The Bureau of Land Management (BLM) statement, Class I and BLM area of Special Interest, on page 2-4 includes the word, "practically." We know of no place in the Clean Air Act that makes that distinction.

Assistant to the Regional Director Isenogle's memorandum of November 8, 1978, (letter No. 2 in the appendix) expresses our concerns about air quality relating to Class I areas. We recommend that the description of Emission Control Equipment on page 1-11 be modified to state that, "Each generating unit (Units 1-4) would be equipped with an electrostatic precipitator. . . and. . . scrubbers . . . ." We believe this will help assure that both the existing and proposed generating units will operate only with such equipment. Any permit issued for this project should include provision for continued monitoring to insure that the scrubbers have been installed for all four units and are being used.

Page 3-8 recognizes the lack of Environmental Protection Agency guidelines of how to assess visibility impacts. In the absence of such guidelines, we must continue in the position stated in Mr. Isenogle's memorandum that any impairment of visibility in Class I areas is a violation of the 1977 Clean Air Act amendments.

Deputy Regional Director
Glen T. Bean

LETTER NUMBER 7

United States Department of the Interior
BUREAU OF RECLAMATION
UPPER COLORADO REGIONAL OFFICE
P.O. BOX 11568
SALT LAKE CITY, UTAH 84147

IN REPLY REFER TO: UC-151
120.1

MAR 2 3 1979

Memorandum

To: District Manager, Bureau of Land Management, Richfield District Office, 150 East 900 North Street, Richfield, Utah 84701

From: Acting Regional Director

Subject: Review of Draft Environmental Statement - Emery Units 3 and 4, Emery Powerplant (DES 79-8)

This office has reviewed the above document for the Bureau of Reclamation, and offers the following comments relative to the effects the two additional generating units in Emery County, Utah, may have on Bureau projects.

General

The Southeastern Utah Association of Governments' "208" study indicated that essentially all waters in the Emery, Carbon, and Grand Counties violate one or more of the State's current water quality standards (water quality is limited). This statement should evaluate the proposed power generating units and their impact and interrelationship with the 208 Water Quality Management Plan relative to whether or not this consumptive use of water would further violate the State's water quality standards.

Specific

1. Page 1-28 - The table on this page shows a Utah Power and Light Company requirement of Emery Project water for 3,000 acre-feet, representing water taken from current agricultural use and converted to industrial use; however, the requirement for Emery Project water for this action is currently up to 4,000 acre-feet. This fact should therefore be reflected in the final statement since this document will be used as the NEPA compliance basis for amending the contract among Emery Water Conservancy District, Utah Power and Light Company, and the Bureau of Reclamation. Furthermore, it should be stated in

the document under "Impacts" how much agricultural land would be taken out of production by the depletion of Emery water. This is the primary effect this action would have on Bureau of Reclamation projects. The only value for this currently given in the statement is 3,415 acres of productive land removed by the loss of the total 14,000 acre-feet of water required for this action.

2. Page 1-53 - It is unclear from the discussion of the Desert Lake Waterfowl Management Area as to the impact the proposed action would have on this area, especially if Utah Power and Light Company's requirement for Emery County water increased at some later date. This would cause a greater depletion of existing irrigation return flows to Desert Lake and thus reduce its total water supply. An additional comment on this page concerns the Hansen Study of water supplies in Desert Lake. It is not clear as to whether or not the 4 to 10 percent reduction is referring to total water supply. If this is the case, then the effect of this reduction on Desert Lake should be stated.

3. Page 1-57 - The third paragraph on this page indicates that the date of the final environmental statement is scheduled for October 1986. This should be deleted as the date has not been set.

4. Page 2-12 - The current status of fisheries on the project-affected portions of Cottonwood, Ferron, and Huntington Creeks is not clear in this table. The effect of existing water diversions on the current fishery status of these streams should also be stated.

5. Page 3-10 - An analysis of impacts on water quality from the conversion of irrigation water to industrial use has apparently not been included in applicable parts of Chapters 3, 5, or 8. Impacts on salinity within the San Rafael, Green, and Colorado Rivers should be addressed. Trace elements and pollutants from sanitary wastes should also be considered. There is a need to clarify the reasoning given for the flow reduction in the Colorado River being only half of the flow reduction in the San Rafael River.

The discussion of impacts on aquatic resources should include how the diversion of additional water from Cottonwood and Ferron Creeks would affect the natural and stocked fisheries on these streams. It is unclear as to why there apparently is no impact on these fisheries caused by the additional water diversions.

6. Page 3-12 - The discussion of the impacts on waterfowl around Utah Lake should include information about the possible hazards involved with birds flying into transmission lines, especially in a

marshland area such as this where many water-oriented birds exist whose behavioral patterns may include feeding migrations to other areas in the valley. This and other flight-related behavior could result in an undetermined loss of birds caused by collision with the transmission lines. An additional comment on this page concerns the discussion of impacts on the Peregrine falcon in the Utah Lake area. This is written as if these birds are actively utilizing this area at the present time. It should be noted, however, that there is presently no active use of nesting areas by falcons in the Wasatch Front area around the lake, although they may occasionally pass through the area.

7. Page 8-4 - The method utilized to obtain water under each alternative should be described and water quality impacts should be analyzed for each one.

The word "would" under the discussion of water source for the Nephi alternative site should be changed to "could."

We appreciate the opportunity afforded us to review this environmental statement, and hope our comments will be useful in your preparation of the final environmental statement.

cc: Director, Office of Environmental Project Review, Office of the
Secretary, Department of the Interior, Washington, D. C. 20240
State Director, Bureau of Land Management, University Club Bldg.,
136 East South Temple, Salt Lake City, Utah 84111
Commissioner, Attention: Code 150

LETTER NUMBER 9

United States Department of the Interior
NATIONAL PARK SERVICE
ROCKY MOUNTAIN REGIONAL OFFICE
655 Parfet Street
P.O. Box 25287
Denver, Colorado 80225

IN REPLY REFER TO:
L7621 (RMR)PC

APR 5 1979

Memorandum

To: District Manager, Richfield District Office, Bureau of Land Management, Richfield, Utah

From: Regional Director, Rocky Mountain Region

Subject: Supplemental comment on Emery Units 3 and 4 (DES 79-8)

In addition to the comments in our subject memorandum of March 26, we have received the following comments from the Air Quality Office at our Denver Service Center.

The statement in Mr. Isenogle's memorandum of November 8 (letter No. 2 in the appendix) that "It is apparent from the data that (there is) the lack of scrubbers . . . ." is enhanced by the following:

If Utah Power and Light Company is allowed to operate units 1 and 2 without 80 percent SO_2 control, the source should be considered a modified source and is subject to the PSD regulation. If this is the case, units 1 and 2 would be considered to consume part of the PSD increment rather than being included only as contributing to background concentrations. The environmental statement should indicate that units 1 and 2 will have 80 percent control. Table 2-1 should show concentration estimates based on the appropriate emission rates.

The last paragraph in our March 26 memorandum is amplified by the following:

It should be pointed out that from the Bureau of Land Management (BLM) visibility monitoring station at Cedar Mountain, east-southeast of the plant site, that visibility degradation from the existing units 1 and 2 has been observed frequently. It should also be pointed out that one of the major causes of visibility degradation, nitrogen dioxide, would be emitted at a rate of 70 tons/day from the proposed units 3 and 4. Therefore, it is extremely important that the potential impact on visibility be thoroughly analyzed in the final environmental statement. The analysis should not be

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limited to a consideration of visual range but should include other visibility-related factors such as chromaticity, brightness, luminance contrast, texture, and haze and how each changes when subjected to the emissions from the new units and how this may relate to visual alteration of landform characteristics. This analysis should be correlated with the more-than-a-year's data on visibility from the BLM Cedar Mountain monitoring station.

The Cedar Mountain visibility measurements include data which was taken while units 1 and 2 were operating without SO_2 controls. The effect this has on the analysis is uncertain but should be clarified.

for Deputy Regional Director
Glen T. Bean

LETTER NUMBER 10

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

IN REPLY REFER TO:
OEPR-DRB
Cooperative Studies
Environmental Impact Statement

APR. 3 1979

Mr. Donald L. Pendleton, District Manager
Richfield District Office
Bureau of Land Management
Department of the Interior
150 East 900 North Street
Richfield, Utah 84701

Dear Mr. Pendleton:

This responds to your recent notice accompanying a draft environmental impact statement for Emery powerplant units 3 and 4 in Emery County, Utah. The Commission staff comments are made in accordance with the National Environmental Policy Act of 1969.

The proposed action would involve the construction and operation of two additional 430-megawatt coal-fired steam-electric generating units at Utah Power and Light Company's Emery generating complex. Unit 1 is currently in operation and unit 2 is scheduled to go on line in 1980. A final environmental statement for units 1 and 2 was made available by the Department of the Interior on March 15, 1977.

According to the draft environmental statement, the flow in the Colorado River, measured at Lee's Ferry, could be reduced by about 3,850 acre-feet per year as a result of the proposed operation of units 3 and 4. This would have the effect of reducing generation at the downstream main-stem Colorado River hydroelectric projects by about 3,300,000 kilowatt-hours annually. This is equivalent to about 1,600 tons of coal or 5,700 barrels of oil annually, either of which would engender long-term losses in terms of irreplaceable fuel resources and subsequent environmental degradation. Potential loss of hydroelectric generation and its effects should be identified in the environmental statement.

We hope that our comments will be helpful to you in the preparation of the final environmental statement.

Sincerely,

William W. Lindsay, Director
Office of Electric Power Regulation

LETTER NUMBER 11

Scott M. Matheson
Governor

Kent Briggs
State Planning Coordinator

STATE OF UTAH
Office of the
STATE PLANNING COORDINATOR
118 State Capitol
Salt Lake City, Utah 84114
(801) 533-5245

April 10, 1979

Donald L. Pendleton
District Manager
Bureau of Land Management
150 East 900 North Street
Richfield, Utah 84701

Dear Mr. Pendleton:

The Environmental Coordinating Committee has reviewed the Draft Environmental Statement for Units 3 and 4 at Utah Power and Light's Emery generating complex near Castle Dale, Utah.

The attached comments stating Utah's position are submitted for your review and consideration.

Thank you for the opportunity to review this document.

Sincerely,

Kent Briggs

Kent Briggs
State Planning Coordinator

KB/lt

Enclosure

STATE OF UTAH COMMENTS

ON

DRAFT ENVIRONMENTAL IMPACT STATEMENT

FOR

EMERY 3 AND 4 UNITS

March 30, 1979

The State of Utah has reviewed the Draft Environmental Statement for Emery Units 3 and 4, and we offer the following comments:

Since the Forest Service's Roadless Area Review and Evaluation (RARE II) process is complete and no wilderness or further planning recommendations were made within the influence zone and all other RARE II areas are being released from wilderness consideration as of April 15, 1979, all references to RARE II areas should be deleted from the final environmental statement.

The document should point out that by overlapping the construction of Units 2 and 3, the work force would be stabilized; thus, the impact would be decreased because of the lack of a boom-bust type cycle.

The project has been reviewed by staff of the State Division of History; and, if the procedures outlined in the draft statement are followed, the project will have no affect on any potential or listed national registered historical, archeological, or cultural sites.

Page 1-53, Paragraph 12

The literature reference (Hansen 1978) should be changed to Vaughn Hansen Associates, 1978, so it will agree with the "Literature Cited" section for reference purposes. Additionally, reduction of return flow waters to the Desert Lake Wildlife Management Area would range from 39 to 61 percent and not 4 to 10 percent. These higher and more significant calculations were made from data in the above-referenced report. The draft environmental statement should identify that the concern is for return flow waters, and other sources of flow will not be affected.

Page 1-66, Table 1-12

This Table indicates that the Utah Division of State Lands would need to grant a 130-foot right-of-way across six miles of State-owned land. This figure would appear to be an error. If the new 345-kV transmission line is to follow the existing 345-kV line, then the length of the right-of-way would probably be closer to eight miles rather than six.

Page 2-11

Paragraph 4 - Moose were released in 1973, 1974, and 1978.

Paragraph 5 - A transplant of twelve desert bighorn sheep into the San Rafael area was accomplished during December 1978. As a result, desert bighorn sheep will be limited in distribution by their habitat, but will not be uncommon.

Page 2-12, Table 2-3

Willow Lake is stocked with fingerling brook trout and catchable rainbow trout. It does not receive rainbow fingerlings. Also, Academy Mill is stocked with only brook trout fingerlings. It does not receive catchable rainbow trout.

Page 2-21

The statement is made that "The State Division of Lands manages Utah State land in the area without land use management plans or programs." This statement is in error as the Division of State Lands does have programs and management plans upon which the State-owned lands are managed.

There is no reference to the Southeastern Utah Association of Government's planning function, although it is the contact agent for a number of State and federal agencies in this area.

Page 2-23, Figure 2-8

We recommend that where State school sections are included in BLM wilderness study areas, provisions be provided to exchange such sections out of the study area.

Page 2-28

The cost-of-living opinions expressed by the author are not based on solid analysis data. Studies done by a variety of agencies within Southeastern Utah and at different times indicate that the statements made herein are inaccurate.

Page 2-36

The description of the traffic environment is significantly underplayed. This area is one of the most significantly impacted areas in the State due to increased truck traffic associated with coal development. We suggest that this area of the text be strengthened with additional facts and information concerning future impacts of increased traffic on the road systems.

Page 2-37

The impact on agriculture is understated. With the rising cost of water and the competition for water between energy development and agricultural needs, this impact needs further analysis.

Page 2-38, Paragraph 3

Wildlife violations increased 235 percent between 1972 (137 violations) and 1977 (459 violations). The increase in human population for this same period is estimated to have been 37 percent.

Page 3-8, Geology and Topography

The impact on watershed and aquifers, which is referred to in later sections of this volume, should also be included in any reference to subsidence.

Page 3-12

Illegal Collecting and Vandalism - We feel that the present problem caused by existing growth should be described under this section. The illusion that increased population will produce increased losses solely due to Units 3 and 4 is misleading, and the reference of "could" occur is more appropriate than "would" occur.

Threatened and Endangered, Paragraph 1 - The last word "uncommon" should be changed to "extremely rare."

Page 3-15, Transportation Systems

The assumption that the increased traffic would accelerate road damage is only true if there is no rail transportation system. Since other planning documents of the State clearly have identified rail as an alternative and since there are outstanding applications with other agencies of the Federal Government for rail permits (by at least two interested parties), this comment must be clarified in the context of possible rail service in the future. In fact, Emery Units 3 and 4 may themselves be a contributing factor of whether rail service comes into the county.

Page 3-17, Table 3-10

Rather than comment on each individual figure on this Table, we will make a general comment that the numbers related to population are completely out of context. The Utah Population Work Committee's preliminary estimate for July, 1978, was 21,300 for Carbon County. (This Committee is the recognized authority for projections for the State and its sub-districts.) This Table would suggest that between the July 1978 estimate and 1980, the population will only be increased to 22,490. Such a small increase is not in the context of the last seven years' growth. Similar disparities in the Emery County totals would lead one to believe that estimates based on the fallacious numbers would mean that the 1980 estimates will have little, if any, validity with or without Emery Units 3 and 4.

Page 3-19

The cost-of-living data, which has been cited, should carry the caveat that the increases of 1973-76 and 1976-85 are without impacts from Emery 3 and 4. The presumption that 3 and 4 will only cause minimal increases to the existing impacts is somewhat naive, since the existing houses and business services will be further impacted by 3 and 4 in that they are not being built in a previously-stable economic environment.

Page 3-26, Tax Base

Significant fiscal problems already exist in Southeastern Utah due to the impact from existing power plants. The statement that the need for increased community services due to 3 and 4 "could be expected" is misleading, since such needs already exist. The capacity of the infrastructure is already being overtaxed in the county. The tax-base issue is one that is not only germane, but underlies most strategies for this and other projects and, as such, should be dealt with in greater detail. The so-called crisis that is created by the need for services preceding the development of a tax base to provide them is always serious in an area of significant growth.

Page 4-2, Table 4-1

The Table should include considerations of period of concern for moose and sage grouse: moose winter range, December 1 through May 15, moose calving area, May 16 through July 15; sage grouse strutting grounds and a two-mile radius, March 15 to June 1.

Page 4-3, Paragraph 3

Deer and elk move into winter ranges about November 1 and remain as long as May 15 each year. During even mild winters, these animals lose weight on winter range forage. During the winter period, harassment or other disturbances cause these animals to unnecessarily utilize their energy reserves for escape purposes. The effects of this activity and wasted energy are measurable as mortality during the winter. Spring green-up temporarily adds to the animals' physical problems, since green, succulent forage causes scours in some animals. Therefore, protection on winter ranges is needed between November 1 and May 15. During such years, protection need only be provided when the animals are actually on winter ranges.

Page 5-3, Threatened and Endangered, Paragraph 1

The phrase "not common" does not portray the rarity of these birds adequately. Change "not common" to "extremely rare."

Page 5-5, Income and Employment

Persons on fixed incomes not only would have difficulties with reduced buying power, but have serious and growing problems in housing and services. Fixed-income residents (including many widows and single-parent families) in existing boom conditions are creating, at times, crisis demands on Social Services, religious, and public welfare agencies. This is a serious consideration with broad impact that needs to be dealt with in detail in the environmental statement.

Page 5-6

Again, traffic seems to be downplayed because of lack of data. In fact, significant studies have been done by the Utah Department of Transportation and the Southeastern Association of Governments. Most important is the omission of references to the increase of non-industrial traffic on U-10 as the communities balloon and for which it is the primary artery. Additionally, U-10 funnels the traffic into the rapidly growing market center of Carbon County. Some larger commentary on the road conditions of U-10 over the last several years should have been included.

LETTER NUMBER 11 (CONTINUED)

Pages 8-60 to 64

Under the alternative of using conveyors to replace truck transport of coal, it is recognized that with the reduction of 686 trucks a day, this would have a substantial positive impact on the road systems. However, this alternative poses some serious concerns from a wildlife standpoint because the conveyor system would disrupt use of winter range by deer and also disrupt migration patterns. Any conveyor system should be worked out in close consultation with State Division of Wildlife biologists and may require detailed studies on natural movement corridors.

Appendixes VIII-3 and VIII-4

The profiles on the Green River Site Transmission Line and the Green River Water Pipeline lists the Utah prairie dog as inhabiting the Buckhorn Flat area. This is incorrect as the Utah prairie dog is an endangered species not found in this area. The prairie dog inhabiting Buckhorn Flat is the white-tailed prairie dog which is in no danger of extinction. Possibly, the reason the prairie dog is placed on the profile is because of the association between prairie dogs and the black-footed ferret, which is endangered. Black-footed ferrets could possibly inhabit the white-tailed prairie dog colonies on Buckhorn Flat.

We appreciate the opportunity to review and comment on this Draft Environmental Impact Statement.

LETTER NUMBER 12

United States Department of the Interior
FISH AND WILDLIFE SERVICE
AREA OFFICE COLORADO—UTAH
1311 FEDERAL BUILDING
125 SOUTH STATE STREET
SALT LAKE CITY, UTAH 84138

IN REPLY REFER TO: (ES) SLC

April 17, 1979

MEMORANDUM

TO: District Manager
Bureau of Land Management
Richfield District Office
Richfield, Utah 84701

FROM: Acting Area Manager
U.S. Fish and Wildlife Service
Salt Lake City, Utah

SUBJECT: Review of draft environmental statement Emery Units 3 and 4, Utah (EC-79/8)

We have reviewed the subject DEIS and offer the following comments for your consideration.

General comments:

With minor exceptions impacts on fish and wildlife resources associated with the proposed development are adequately described and discussed.

Specific Comments:

Pg. 1-53: Desert Lake Waterfowl Management Area-Paragraph 3. Recent information regarding potential depletions to Desert Lake WMA indicates a much smaller amount than the 4-10 percent reduction presented here.

Pg. 3-12: Threatened and Endangered Species-Paragraph 6.

Pursuant to Section 7 of the Endangered Species Act of 1973 our Service transmitted to your State Director an official "Biological Opinion" for Emery Units 3 and 4 on December 15, 1978. (copy attached)

Chapter 5: Adverse Impacts Which Cannot Be Avoided. . . . In chapter 3 (Environmental Impacts) you identify a reduction in pheasant habitat of 7.4 percent. We find no mitigation measures to offset this loss nor is it mentioned under adverse impacts. Clarification is needed here.

LETTER NUMBER 12 (CONTINUED)

Pg. 8-60: Coal Transportation Alternative-Conveyor systems for coal transportation can have serious impacts on big game if not properly designed and implemented. The obvious physical barrier plus the increased noise levels are two areas of major concern. If this alternative is seriously considered it should be very closely coordinated with the Utah Division of Wildlife Resources with design features incorporated which will minimize potential damage to big game herds.

Through cooperative efforts between our respective staffs, the Utah Division of Wildlife Resources, the Bureau of Reclamation and Utah Power and Light most of the aforementioned problems with the DEIS have been resolved to everyone's satisfaction.

Thank you for giving us an opportunity to review and comment on this statement. Your cooperation towards resolving prolems and finalizing the document are greatly appreciated.

William C. White

Attachment

LETTER NUMBER 13

United States Department of Agriculture
Soil Conservation Service

4012 Federal Building
125 South State Street
Salt Lake City, UT 84138

April 18, 1979

Donald L. Pendleton
District Manager
Richfield District Office
Bureau of Land Management
150 East 900 North
Richfield, UT 84701

Dear Mr. Pendleton:

We have reviewed the draft environmental statement for Utah Power and Light Company's Emery (Hunter) Generating Complex, Units 3 and 4. Most of the areas of concern to the Soil Conservation Service have been adequately addressed.

One additional problem could be significant. When the irrigation water supply is removed from farmland, serious erosion problems can develop unless permanent vegetation adapted to low rainfall areas is re-established before the water supply is gone. We have no other comments.

Sincerely,

George D. McMillan
State Conservationist

cc: Administrator, SCS, USDA, Washington, D. C. 20013
(5) Director, Office of Federal Activities (Mail Code A-104)
Environmental Protection Agency, Room 537 West Tower,
401 "M" Street, S.W., Washington, D.C. 20460

LETTER NUMBER 34

Utah Power & Light Company
1407 WEST NORTH TEMPLE STREET
P. O. BOX 899
SALT LAKE CITY, UTAH 84110

April 30, 1979

Mr. Donald L. Pendleton, District Manager
Bureau of Land Management
150 East 900 North
Richfield, Utah 84701

Subject: Comments on Draft Environmental Statement
Emery Units 3 and 4

Dear Mr. Pendleton:

We are submitting the following comments on the Emery 3 and 4 Draft Environmental Statement:

Page 1-40, Ambient Air Quality Monitoring
Add: A permanent air quality monitoring station has been established about 3 miles west southwest of the plant measuring SO_2, NO_x wind speed and direction. An SO_2 monitor has been established near the entrance to the plant adjacent to U-10.

Page 2-13, second line under Threatened and Endangered Wildlife:
Now reads: ".....only known endangered animals in the areas."
Should read: ".....only known endangered animals or bids in the area."

Page 3-8, first line under Geology and Topography:
Now reads: "Subsidence would be expected to occur..... ."
Should read: "Subsidence could..... ."
We have encountered those who take this statement as fact that subsidence will occur, not that it may occur, depending geological structure above the coal seam being mined, and depth of over burden over the seam.

Page 3-10, first line under Terrestial Wildlife:
Now reads: "Increase in human population would contribute to the loss and harassment..... ."
Should read: "Increase in human population would contribute to the increased loss and harassment..... ."

Page 3-15, last sentence in 2nd paragraph under Transportation systems:
The sentence now reads: "If the development of this portal is not coordinated with these agencies, it could preclude the development of coal and other resources up canyon by blocking access to those resources.
Utah Power & Light has proposed on page 1-19 in the DES to construct a 24 foot wide paved road to the Cottonwood portal, which is a major upgrading of the present county and USFS road up Cottonwood Canyon, thereby providing much improved access to the mining area and to the canyon above the mine.
I suggest the sentence on page 3-15 relate more closely to the proposed access as described on page 1-19, or more clearly relate to what access is being blocked.

Page 5-5, last sentence in 2nd paragraph under Transportation Systems
See comments made for page 3-15.

Page 7-2 Water Resources
Under flow changes in springs and seeps caused by subsidence; the loss of water from the springs and seeps would be irreversible but not necessarily irretrievable as the water will not be lost and will reappear at another location.

Page 8-8, figure 8-3
The location of the Wellington Plant site has been changed, see new location on attached copy of figure 8-3.

Page 8-49, second sentence under 500 KV lines:
Now reads: "System reliability would be somehwat reduced, since loss of the line..... ."
Should read: "System reliability would be considerably reduced, since the loss of the line..... ."
If a 500 KV line was installed to replace the two 345 KV lines, and the 500 KV line was lost, this loss would result in a probable system instability, whereas the loss of one 345 KV line would result in continued stable operation of the system.

Page 8-49, 500 KV line
The alternate proposed route for a 500 KV line would be parallel to the present Manti Top 345 KV line.

Page 8-63 Existing Environment, 2nd line
Now reads: "Marshalling area in the mouth of Cottonwood Canyon..... ."
Should read: "Marshalling area near the junction of the Wilbert coal haul road and U-29..... ."

LETTER NUMBER 34 (CONTINUED)

Mr. Donald L. Pendleton
April 30, 1979
Page 3

Page 9-1, History of Consultation and Coordination, 1st line
Now reads: "On April 18, 1978, a meeting was held..... ."
Should read: "On April 18, 1977, a meeting was held..... ."

Very truly yours,

R. D. Davis
Project Supervisor

RDD/KMN:fb

cc: M. W. Russon
R. D. Davis
K. M. Neuschwander

LETTER NUMBER 35

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
324 25th Street
Ogden, Utah 84401

[illegible]

Mr. Donald L. Pendleton
District Manager
Bureau of Land Management
Richfield District Office
150 East 900 North Street
Richfield, Utah 84701

Dear Mr. Pendleton:

Reference is made to your draft environmental statement for the "Emery Power Plant: Units 3 and 4." Following is a consolidated reply from the Forest Service, Intermountain Region. This reply includes input from the Manti-LaSal National Forest, Uinta National Forest, and our Regional Office.

1. Numerous discussions and communications between agencies and Utah Power and Light Company (UP&L) have stressed the need to double circuit the proposed transmission line through the Spanish Fork Canyon corridor. In chapter 1, pages 1-34, paragraph 4, it appears that double circuiting has been adequately addressed. However, the paragraph only commits UP&L to the enlargement of the foundations on the tangent towers. This does not satisfy our needs or concerns. We have rewritten this paragraph on the enclosure.

2. Enclosed is a copy of Appendix II-2, page 11, with some corrections. We have attempted to make these minor changes twice before, in both the draft and final of the Emery 1 Environmental Statement. It is important that we convey correct and accurate identification of estimated potential for landslides, erosion hazard, and revegetation potential.

3. It is recommended the final statement require construction of a two-lane paved road from the junction of Highway 29, up Cottonwood Canyon, across BLM through the Cottonwood Site, to the Forest boundary. The roadbed subgrade should be of sufficient width for placement of any future pavement structure necessary to provide the final paved width for all future uses. A paved pavement structure to carry the present traffic and proposed mining traffic safely for the design period of the mine should be placed prior to full development of the mine.

LETTER NUMBER 35 (CONTINUED)

4. A serious point of concern is the location of the proposed development of the Cottonwood Portal of the Wilberg Mine. The Forest Service requested that two alternative locations be reviewed. These alternatives should be reviewed and included in the final statement. The alternatives are lower in the canyon and would reduce congestion of traffic. It cannot be emphasized too strongly that unless great care in planning is taken, the development of coal and other resources further up the canyon will be impaired or even totally blocked for the life of the portal complex. This point should be stressed throughout this document, and added as a point for mitigation in Chapter 4.

5. Figure 1-10 on page 1-21, Proposed Cottonwood Portal Layout, is inadequate. For example, no dimensions are given, and no cut and fill figures are shown. The location of Trail Mountain Mine Portal with its close proximity to proposed Cottonwood Portal is not shown. Unless careful planning and coordination occur, resources further up the canyon will suffer.

6. Figure 1-28 on page 1-58, Interrelated Coal Mining, in the Legend, numbers 15 (Deer Creek Mine) and 16 (Wilberg Mine) are shown to be owned by Peabody Coal Company. These two mines were sold to Utah Power and Light Company by Peabody nearly two years ago.

7. Page 1-63 lists authorizing action. All of the rights-of-way need to be coordinated into an access and utility corridor.

8. Pages 1-27 and 1-24 are confusing as to whether the same corridors or right-of-way width will be used for water, sewer, power, and conveyor. A 100-foot right-of-way appears excessive for a 42-inch conveyor belt, and a 50-foot right-of-way appears narrow for a two-lane paved road. Typical cross sections showing size and placement of the roadway, waterline, sewerline, powerline, and conveyor within the access and utility corridors are needed. The cross sections should be site specific, showing the existing roadway, stream and ground line with respect to the proposed road and utilities. Sufficient cross sections should be provided to allow accurate determination of impacts within the canyon.

9. Page 1-64 lists an electronics site for communication repeater station. Forty acres appears excessive for this use.

Please include these comments in your final environmental statement for Emery units 3 and 4.

Sincerely,

for P.M. REES
Director, Regional Planning
and Budget

Enclosures

LETTER NUMBER 36

United States Department of the Interior
GEOLOGICAL SURVEY
RESTON, VA 22092

In Reply Refer To:
EGS-Mail Stop 760

1 MAY 1979

Memorandum

To: Assistant to the Director, Office of Coal Management
Bureau of Land Management

From: Chief, Preparation Branch
Environmental Impact Analysis Program

Subject: Comments on the draft environmental statement (DES) for the Emery Power Plant Units 3 & 4

The attached informal comments are the result of the Geological Survey's review of the subject DES. These informal comments are largely on areas of U.S. Geological Survey technical expertise and policy concerns, and we hope they will be helpful in completing the final statement.

Any questions regarding the comments should be addressed to Edward Pickering (860-6464).

for
Kenneth E. Vanlier

Enclosure

Copy to:
T. Loomis, OEPR
A. Kashinski, SOL
J. Lovell, BLM

One Hundred Years of Earth Science in the Public Service

LETTER NUMBER 36 (CONTINUED)

p. 1-16, Coal Supply, paragraph 5. The feasibility of longwall mining should be fully evaluated to take advantage of higher extraction ratios and conservation of resources.

p. 1-54, Generating Complexes. The proposed Warner Valley and Harry Allen powerplants (Southern Utah Coal DES) should be included in this DES as related generating complexes.

p. 2-6. We believe more detail relating to the "Geology and Topography" section should be added. In discussing the siting of a powerplant and transmission lines, a summary of the Bechtel contract report pertaining to the geology, seismology, and foundation materials of the subject lands should be included. As it presently exists, the section is inadequate.

p. 2-13. The Advisory Council on Historic Preservation should be notified of the Utah State Historic Preservation Officer's determination, as required under 36 CFR Part 800.

P. 2-21, Wilderness and Roadless Areas. This section should include U.S. Forest Service RARE II final recommendations of January 1979. Most of the RARE II areas affected by this proposal have been recommended for nonwilderness uses.

p. 3-15, Wilderness. See comments on p. 2-21, Wilderness and Roadless Areas.

p. 5-4, Minerals. See comments on p. 1-16, Coal Supply.

p. 5-4, Wilderness. See comments on p. 2-21, Wilderness and Roadless Areas.

Chapter 8, Alternatives. Although this chapter contains an adequate discussion of alternative powerplant sites, water supplies, coal transportation routes, and others, one set of alternatives is conspicuous in its absence. That is, provided the Emery Units 3 & 4 are approved as proposed, what will be the source of the coal if the proposed Cottonwood portal of the Wilberg Mine is not approved? An in-depth discussion of alternative coal sources, coal transportation routes, coal loadout facilities, and associated impacts and mitigating measures is necessary to complete this chapter, as well as the EIS.

p. 9-3. "Office of Surface Management" should be "Office of Surface Mining, Reclamation, and Enforcement (OSM)."

p. 9-9. The formal consultation process for endangered and/or threatened flora and fauna must be completed prior to approval of the proposed action, such as the American peregrine falcon, Bald Eagle, Colorado River squawfish, Colorado River humpback chub, black-footed ferret, proposed threatened razorback sucker, proposed endangered bony tail chub, and the "scorpion weed," among others.

LETTER NUMBER 37

United States Department of the Interior
HERITAGE CONSERVATION AND RECREATION SERVICE
MID-CONTINENT REGION
DENVER, COLORADO 80225
MAILING ADDRESS
Post Office Box 25387
Denver Federal Center
Denver, Colorado 80225

IN REPLY REFER TO
DES 79-8

APR 24 1979

Memorandum

To: Manager, Bureau of Land Management, Richfield, Utah

From: Assistant Regional Director, Land Use Coordination

Subject: Review of Draft Environmental Statement for Emery Power Plant, Units 3 and 4, Emery County, Utah

We note (p. 3-12) that "Highly important paleontological remains . . . could be destroyed during construction of the transmission line." We suggest that the final environmental statement discuss any plans which may exist for mitigation of this loss of paleontological remains. If no plans exist, the final statement should provide an expanded discussion of the significance of the expected loss.—

Robert J. Arkins

LETTER NUMBER 38

Department Of Energy
Western Area Power Administration
P.O. Box 11606
Salt Lake City, Utah 84147

In Reply
Refer to: L2201
120.-/5400

AUG 3 1979

Bureau of Land Management
Richfield District Office
150 East 900 North Street
Richfield, Utah 84701

Gentlemen:

This office has reviewed the Draft Environmental Impact Statement for the proposed construction of generating units #3 and #4 at Utah Power and Light's Emery generating complex near Castle Dale, Utah. The review was made with particular attention paid to the proposed and the alternative power features.

Generally, the impact statement appears to be well prepared. Specifically, in regards to the power features, such details as the site location, type of transmission line structures, structure locations, right-of-way requirements, etc. have been thoroughly and sufficiently covered in enough detail to adequately determine their environmental impact.

Likewise, alternative plant site locations and alternative transmission line routing have been sufficiently described to determine their environmental impact in relation to the proposed location and routing.

Please feel free to contact us if we can be of further assistance.

Sincerely yours,

A. M. Gabiola
A. M. Gabiola
Area Manager

cc: Administrator, Western, Golden, Colorado, Attn: A2000 & A6000
District Manager, Western, Montrose, Colorado
State Director, Bureau of Land Management, 136 E. So Temple,
University Club Building, Salt Lake City, Utah 84111

LETTER NUMBER 39

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
1860 LINCOLN STREET
DENVER, COLORADO 80295

AUG 10 1979

REF: 8W-EE

Donald Pendleton
Bureau of Land Management
Richfield District Office
150 East 900 North Street
Richfield, Utah 84701

Dear Mr. Pendleton:

The Region VIII office of the Environmental Protection Agency has completed its review of the draft environmental statement (ES) on Emery Units 3 and 4. During our brief review of the project we identified the potential impacts on visibility to be of primary concern. Similarly, the U.S. Park Service is concerned about both present and potential future developments and their effects on visibility on Park Service lands. The Park Service is presently gathering baseline data from telephotometers placed in a number of national parks, including Capitol Reef, Canyonlands, Bryce and Zion in Utah. They are gathering information on baseline visibility in advance of our agency's promulation of visibility regulations. Once these regulations are ready, the information gathered by the Park Service may be utilized to require existing major facilities to retrofit best available retrofit technology to reduce emissions and enhance clean air and visibility in these Class I areas. EPA will be evaluating a PSD permit application for the project in cooperation with the National Park Service.

Pending completion of data collection and the promulgation of visibility regulations we have rated the draft ES for Emery Units 3 and 4 as ER-2. This means we have significant reservations regarding the air quality and visibility impacts from the project. Furthermore, we would like to see future additional work be done in cooperation with EPA and the Park Service to help resolve these issues.

We appreciate the opportunity to review this draft ES and request you provide us with five copies of the final ES for our review. If you have any questions, please contact Dennis Sohocki at (FTS) 327-4831.

Sincerely yours,

for - Alan Merson
Regional Administrator

BACK MATTER

APPENDIXES 1

ABBREVIATIONS 49

REFERENCES CITED 53

APPENDIX I-1

Site Selection Criteria

During April, 1976, Utah Power and Light contracted with Bechtel Power Corporation to screen various sites to determine a preferred candidate site and several prime alternatives for the development of two 500-MW coal-fired power units for operation in 1986 and 1988.

Bechtel screened fifteen sites using the following factors:

I. Engineering/Economic Criteria

  A. Geology, Seismology, and Foundation Material
  B. Water Supply System
  C. Site Development
  D. Fuel Transportation and Access
  E. Transmission System
  F. Proximity of Hazards
  G. Air Quality Maintenance
  H. Property Availability
  I. Construction Impact Mitigation and Labor Force

II. Environmental Criteria

  A. Terrestrial Ecology
  B. Aquatic Ecology
  C. Ground Water and Surface Water
  D. Atmospheric Effects
  E. Corridor Effects
  F. Noise

III. Sociological Criteria

  A. Land Use
  B. Demography
  C. Community Infrastructure
  D. Economic and Social Effects
  E. Agricultural Productivity
  F. Transportation Effects
  G. Cultural Resources
  H. Aesthetics

For a complete description of this process, see Bechtel's Report (Utah Power and Light, 1977).

APPENDIX I-2

Purpose and Status of 208 Study in Southeastern Utah Association of Governments

February, 1978

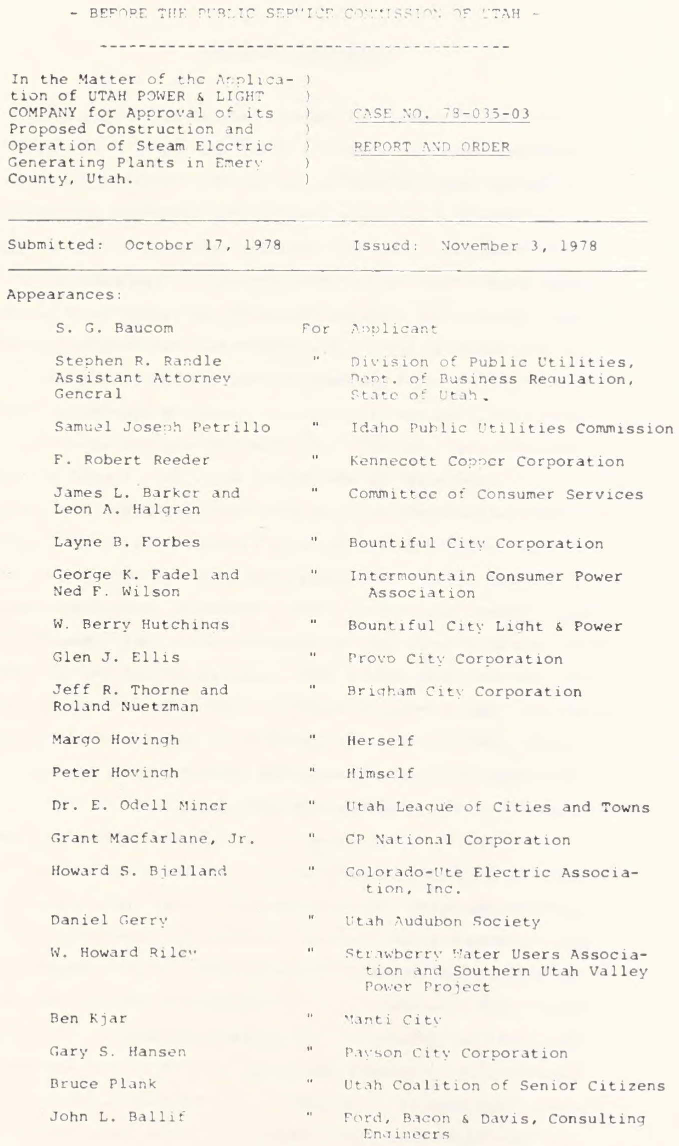
In response to Section 208 of the Federal Water Pollution Control Act, Amendments of 1972, PL 92-500, the Governor of Utah in early 1975 designated the Southeastern Utah Association of Governments (Carbon, Emery, and Grand counties) as the 208 area-wide water quality planning agency for this area. The agency was funded by EPA for a 2 year planning effort to study water quality and initiate a plan to resolve both point and nonpoint sources of pollution. This process is to result in a plan which would upgrade water quality wherever possible, in order to meet the eventual goal of PL 92-500. This goal is to ". . .restore and maintain the chemical, physical, and biological integrity of the Nation's water." An interim objective is to provide ". . .for the protection and propagation of fish, shellfish, and wildlife and . . . for recreation in and on the water (to) be achieved by July 1, 1983."

The 208 plan provides for an initial inventory of the water quality of the area and an evaluation of the municipal, industrial, agricultural, natural, and other sources of pollution. It also evaluates the projected expansion of pollution sources over the next 20 years and recommends procedures for preservation or upgrading of water quality. It is intended that periodic update will keep the plan current and allow for the integration of the efforts of all local, federal, and state agencies to achieve control of water pollution. In order to accomplish this coordination on the federal level, EPA has entered into interagency agreements with the various federal agencies such as Department of the Interior, Department of Agriculture, etc. The State, on the other hand, insures the integration of all of State planning efforts by the Governor's certifying the locally produced 208 plan as the official State water pollution control plan for that area.

The 208 plan for the Carbon, Emery, and Grand county areas has been completed, presented at public hearings in each of the counties, and is receiving final editing prior to its certification by the Governor and acceptance by EPA.

APPENDIX I-3

page 1



- BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH -

In the Matter of the Application of UTAH POWER & LIGHT COMPANY for Approval of its Proposed Construction and Operation of Steam Electric Generating Plants in Emery County, Utah.

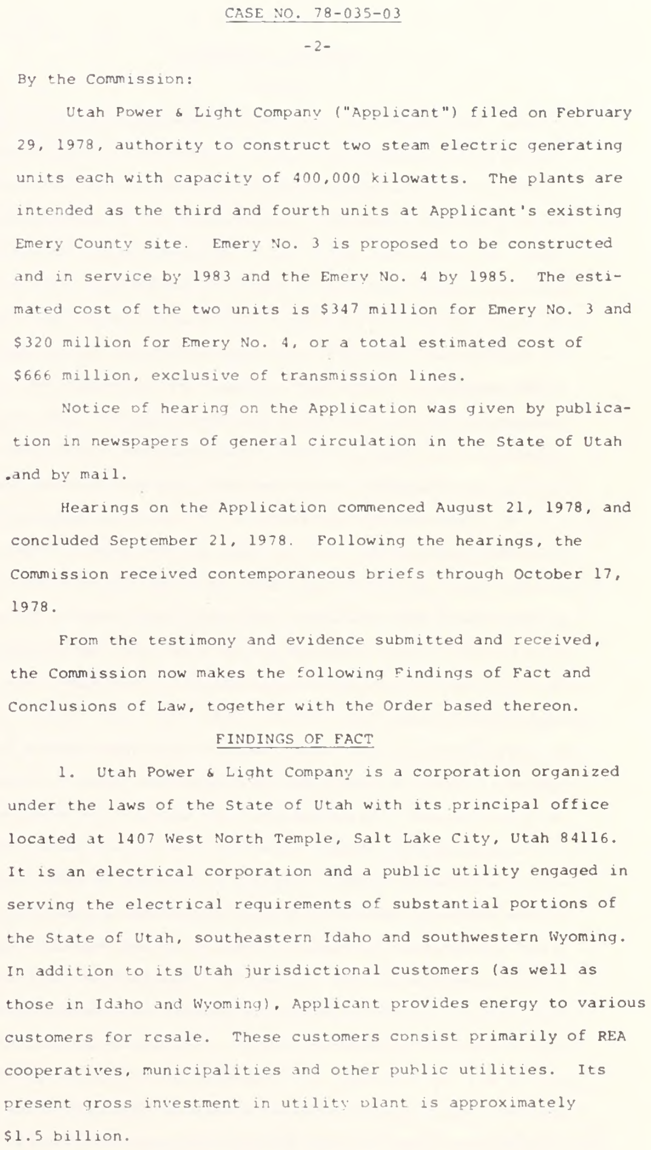
CASE NO. 78-035-03

REPORT AND ORDER

Submitted: October 17, 1978 Issued: November 3, 1978

Appearances:

S. G. Baucom	For	Applicant
Stephen R. Randle Assistant Attorney General	"	Division of Public Utilities, Dept. of Business Regulation, State of Utah.
Samuel Joseph Petrillo	"	Idaho Public Utilities Commission
F. Robert Reeder	"	Kennecott Copper Corporation
James L. Barker and Leon A. Halgren	"	Committee of Consumer Services
Layne B. Forbes	"	Bountiful City Corporation
George K. Fadel and Ned F. Wilson	"	Intermountain Consumer Power Association
W. Berry Hutchings	"	Bountiful City Light & Power
Glen J. Ellis	"	Provo City Corporation
Jeff R. Thorne and Roland Nuetzman	"	Brigham City Corporation
Margo Hovingh	"	Herself
Peter Hovingh	"	Himself
Dr. E. Odell Miner	"	Utah League of Cities and Towns
Grant Macfarlane, Jr.	"	CP National Corporation
Howard S. Bjelland	"	Colorado-Ute Electric Association, Inc.
Daniel Gerry	"	Utah Audubon Society
W. Howard Riley	"	Strawberry Water Users Association and Southern Utah Valley Power Project
Ben Kjar	"	Manti City
Gary S. Hansen	"	Payson City Corporation
Bruce Plank	"	Utah Coalition of Senior Citizens
John L. Ballif	"	Ford, Bacon & Davis, Consulting Engineers



CASE NO. 78-035-03

-2-

By the Commission:

Utah Power & Light Company ("Applicant") filed on February 29, 1978, authority to construct two steam electric generating units each with capacity of 400,000 kilowatts. The plants are intended as the third and fourth units at Applicant's existing Emery County site. Emery No. 3 is proposed to be constructed and in service by 1983 and the Emery No. 4 by 1985. The estimated cost of the two units is $347 million for Emery No. 3 and $320 million for Emery No. 4, or a total estimated cost of $666 million, exclusive of transmission lines.

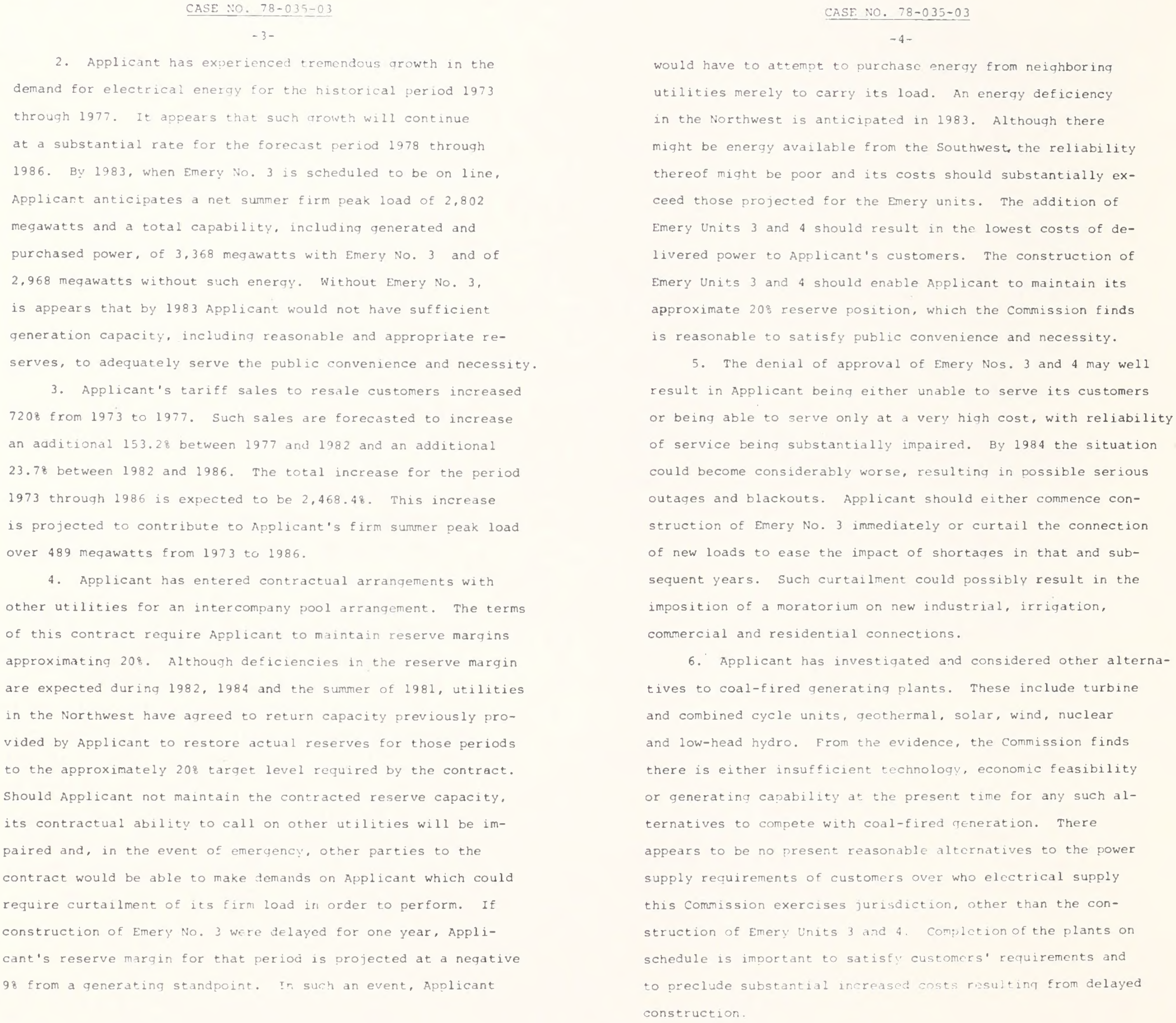
Notice of hearing on the Application was given by publication in newspapers of general circulation in the State of Utah and by mail.

Hearings on the Application commenced August 21, 1978, and concluded September 21, 1978. Following the hearings, the Commission received contemporaneous briefs through October 17, 1978.

From the testimony and evidence submitted and received, the Commission now makes the following Findings of Fact and Conclusions of Law, together with the Order based thereon.

FINDINGS OF FACT

1. Utah Power & Light Company is a corporation organized under the laws of the State of Utah with its principal office located at 1407 West North Temple, Salt Lake City, Utah 84116. It is an electrical corporation and a public utility engaged in serving the electrical requirements of substantial portions of the State of Utah, southeastern Idaho and southwestern Wyoming. In addition to its Utah jurisdictional customers (as well as those in Idaho and Wyoming), Applicant provides energy to various customers for resale. These customers consist primarily of REA cooperatives, municipalities and other public utilities. Its present gross investment in utility plant is approximately $1.5 billion.



2. Applicant has experienced tremendous growth in the demand for electrical energy for the historical period 1973 through 1977. It appears that such growth will continue at a substantial rate for the forecast period 1978 through 1986. By 1983, when Emery No. 3 is scheduled to be on line, Applicant anticipates a net summer firm peak load of 2,802 megawatts and a total capability, including generated and purchased power, of 3,368 megawatts with Emery No. 3 and of 2,968 megawatts without such energy. Without Emery No. 3, is appears that by 1983 Applicant would not have sufficient generation capacity, including reasonable and appropriate reserves, to adequately serve the public convenience and necessity.

3. Applicant's tariff sales to resale customers increased 720% from 1973 to 1977. Such sales are forecasted to increase an additional 153.2% between 1977 and 1982 and an additional 23.7% between 1982 and 1986. The total increase for the period 1973 through 1986 is expected to be 2,468.4%. This increase is projected to contribute to Applicant's firm summer peak load over 489 megawatts from 1973 to 1986.

4. Applicant has entered contractual arrangements with other utilities for an intercompany pool arrangement. The terms of this contract require Applicant to maintain reserve margins approximating 20%. Although deficiencies in the reserve margin are expected during 1982, 1984 and the summer of 1981, utilities in the Northwest have agreed to return capacity previously provided by Applicant to restore actual reserves for those periods to the approximately 20% target level required by the contract. Should Applicant not maintain the contracted reserve capacity, its contractual ability to call on other utilities will be impaired and, in the event of emergency, other parties to the contract would be able to make demands on Applicant which could require curtailment of its firm load in order to perform. If construction of Emery No. 3 were delayed for one year, Applicant's reserve margin for that period is projected at a negative 9% from a generating standpoint. In such an event, Applicant would have to attempt to purchase energy from neighboring utilities merely to carry its load. An energy deficiency in the Northwest is anticipated in 1983. Although there might be energy available from the Southwest, the reliability thereof might be poor and its costs should substantially exceed those projected for the Emery units. The addition of Emery Units 3 and 4 should result in the lowest costs of delivered power to Applicant's customers. The construction of Emery Units 3 and 4 should enable Applicant to maintain its approximate 20% reserve position, which the Commission finds is reasonable to satisfy public convenience and necessity.

5. The denial of approval of Emery Nos. 3 and 4 may well result in Applicant being either unable to serve its customers or being able to serve only at a very high cost, with reliability of service being substantially impaired. By 1984 the situation could become considerably worse, resulting in possible serious outages and blackouts. Applicant should either commence construction of Emery No. 3 immediately or curtail the connection of new loads to ease the impact of shortages in that and subsequent years. Such curtailment could possibly result in the imposition of a moratorium on new industrial, irrigation, commercial and residential connections.

6. Applicant has investigated and considered other alternatives to coal-fired generating plants. These include turbine and combined cycle units, geothermal, solar, wind, nuclear and low-head hydro. From the evidence, the Commission finds there is either insufficient technology, economic feasibility or generating capability at the present time for any such alternatives to compete with coal-fired generation. There appears to be no present reasonable alternatives to the power supply requirements of customers over who electrical supply this Commission exercises jurisdiction, other than the construction of Emery Units 3 and 4. Completion of the plants on schedule is important to satisfy customers' requirements and to preclude substantial increased costs resulting from delayed construction.

7. Environmental regulations substantially limit and reduce the number of locations within or located reasonably near Applicant's service area at which coal-fired generating plants can be constructed. Considering the environmental factors as well as economic ones, including accessibility to coal, financial costs in construction, labor availability and the like, the proposed locations for Emery Units 3 and 4 are found by the Commission to be appropriate. Environmental control equipment will account for approximately 27% of the total costs of the two plants.

8. Applicant's statement of income for the twelve months ending July 31, 1978, and its balance sheet dated as of July 31, 1978, were introduced into evidence. The Commission finds that Applicant is solvent and is financially capable of undertaking the proposed construction program, subject to its ability to charge sufficient rates and thereby generate sufficient revenue to attract capital at a reasonable cost and in sufficient amounts. It is projected for the years 1978 through 1987 that Applicant will spend approximately $3.7 billion (including the $666 million for Emery Units 3 and 4) to construct additional facilities. Applicant's gross investment, presently about $1.5 billion, will increase to $5 billion in that ten-year period--an increase of about 24% per year.

9. The construction of Emery Units 3 and 4 is for the purpose of enabling Applicant to properly serve its present and future customers. The Commission is primarily concerned with the protection of Applicant's Utah jurisdictional customers, but finds that it would not be in the public interest to limit Applicant to capacity dependent only upon those customers. Applicant presented evidence showing that at the present time the Federal Energy Regulatory Commission jurisdictional customers are effectively returning to Applicant a rate of return at least equivalent to the one being earned in this jurisdiction, if not a little higher. Public convenience and necessity appear to be served by Applicant meeting its contractual and other

obligations to its resale customers in the State of Utah, provided that it not enter into any new, renewal, replacement or extension contracts under which it would supply firm service to customers for resale without first receiving the express approval of the Commission.

10. Evidence was received by the Commission concerning the possibility of reducing energy consumption by the implementation of a voltage regulation program. Such program has been instituted in the State of California. The Commission finds that voltage reduction programs should receive further consideration, although the evidence demonstrates that such program would not be an alternative to the construction of Emery Units 3 and 4. The differences between Utah and California concerning lengths of transmission and distribution lines and customer density may make state comparisons not very meaningful. It does appear reasonable that studies be undertaken by Utah Power & Light Company of a representative sample of its various kinds of distribution lines and facilities, e.g., rural, urban, city, commercial, industrial, etc., to determine the feasibility of a voltage reduction program. The evidence does reflect that Applicant has pursued some voltage reduction effort. It should report its findings to the Commission and to the Division of Public Utilities within six months concerning the details of existing voltage limits of delivered service voltages at various levels. The authorization for the construction of Emery Units 3 and 4 should not be delayed pending such studies, but it is reasonable that Applicant study this subject and present to the Commission and Division of Public Utilities a feasible plan with due consideration for benefits in relation to costs that such a program may achieve.

11. The Commission also received evidence concerning the use of co-generation as a possible means of reducing the necessity for construction of central station units. The Commission finds that at the present time co-generation is not a suitable alternative, either economically or environmentally, to the construction of Emery Units 3 and 4. The sites suggested for

co-generation are largely located in areas where additional pollutants would not be allowed and there was evidence presented showing that co-generation could not be accomplished without use of additional fuel as illustrated by the testimony and evidence on the law of thermodynamics. The impact of co-generation, upon energy requirements even if it could be successfully implemented, would appear to be minimal. In any event, the lead time on an appropriate study and implementation of use of co-generation would be too long to effect the present need for Emery Units 3 and 4.

12. The Commission received testimony recommending that approval of Emery Units 3 and 4 be conditioned upon Applicant entering into arrangements with municipalities and others for joint ownership and construction of the plants. The Commission is concerned with the fair and equitable treatment of Applicant's jurisdictional customers and it finds that the protential problems at the present time with requiring such joint construction and operation may outweigh the benefits to be obtained therefrom. The Commission therefore finds that it appears not in the public interest at the present time to either require or prohibit Applicant from entering into agreements with municipalities or others for joint construction or operation of its plants. Any such arrangements should fully compensate Applicant for its costs incurred at the time of construction, including all carrying costs, and should maximize the benefits to jurisdictional utility customers in the State of Utah. If Applicant should desire to enter any such joint construction agreements, it may do so only after receiving approval of the Commission after appropriate hearing.

13. The Commission finds the schedule for construction and completion of both Emery units reasonably supported by the testimony and evidence and it feels the need therefor has been amply demonstrated. If, however, it becomes necessary to deviate in any material way from said schedule, the Commission should be promptly informed through an appropriate filing.

CONCLUSIONS OF LAW

From the foregoing Findings of Fact, the Commission makes the following conclusions:

1. Utah Power & Light Company should be authorized to construct two 400 megawatt steam electric generating units in Emery County, Utah, and such units should be of a size to generate collectively 800,000 kilowatts of electricity.

2. Applicant should be issued authority to construct and operate said units and to receive a certificate of convenience and necessity from the Commission for that purpose. As to contracts, agreements and arrangements necessary to pursue the construction of said steam generating plants, the Commission is mindful of its authority, pursuant to Section 54-4-26, Utah Code Annotated, 1953, to review and approve such contracts, as it may order. In view of this statutory provision, the Commission should require Utah Power & Light to report to the Commission and the Division of Public Utilities, twice each year, its projected and anticipated construction projects pertaining to Emery Units 3 and 4, the dollar amounts thereof, the general description of such projects, and outline its intended bidding practices and procedures for pursuing the letting of bids for any portion of the construction or for the provision of materials, supplies and equipment for the construction of said units.

3. Applicant should conduct a voltage reduction study as outlined in our Findings and, when such study is completed, should report its findings and recommendations to the Commission and to the Division of Public Utilities.

4. Applicant should not enter into any new, renewal, extensions or replacement contracts under which it would provide firm service to customers for resale without first receiving the approval of the Commission therefor.

5. The authority to construct Emery Units 3 and 4 should not be conditioned upon Applicant entering into arrangements with municipalities or others for joint ownership and construction of said units. Applicant should be permitted to enter

APPENDIX I-3 (concluded)

page 5

such arrangements only after receiving express approval of the Commission after appropriate hearing.

6. In the event that the schedule for construction of either Emery Units 3 and 4 should be significantly altered because of error in growth and demand projection or for any other reasons, or become incapable of accomplishment, the Commission should be promptly informed through an appropriate filing.

ORDER

Based upon the foregoing Conclusions, the Commission therefore orders:

1. Utah Power & Light Company is hereby authorized to construct two 400 megawatt steam electric generating units in Emery County, Utah. Such units shall be of a size to generate collectively 800,000 kilowatts of electricity.

2. Applicant is hereby issued authority to construct and operate said units and to receive a certificate of convenience and necessity from the Commission for that purpose. As to contracts, agreements and arrangements necessary to pursue the construction of said steam generating plants, the Commission is mindful of its authority, prusuant to Section 54-4-26, Utah Code Annotated, 1953, to review and approve such contracts, as it may order. Based theron, the Commission hereby orders Utah Power & Light to report to the Commission and the Division of Public Utilities, twice each year, its projected and anticipated construction projects pertaining to Emery Units 3 and 4, the dollar amounts thereof, the general description of such projects, and outline its intended bidding practices and procedures for pursuing the letting of bids for any portion of the construction or for the provision of materials, supplies and equipment for the construction of said units.

3. Applicant shall conduct a voltage reduction study within the guidelines set forth in the Findings of Fact above, and report its findings and recommendations to this Commission and the Division of Public Utilities within six months from the date hereof.

4. Applicant shall not enter into any new, renewal, extension or replacement contracts under which it is to provide firm service to customers for resale without first receiving the approval of the Commission therefor.

5. The authority to construct Emery Units 3 and 4 is not conditioned upon Applicant entering into arrangements with municipalities or others for joint ownership and construction of said units. Applicant may enter into such arrangements only after receiving express approval of the Commission after appropriate hearing.

6. In the event that the schedule for construction of either Emery Units 3 and 4 should be significantly altered because of error in growth or demand projections or for any other reason, or become incapable of the accomplishment, the Commission should be promptly informed through an appropriate filing.

This order shall take effect as of the date hereof.

DATED at Salt Lake City, Utah this 3rd day of November, 1978.

/s/ Milly O. Bernard, Chairman

(SEAL) /s/ Olof E. Zundel, Commissioner

/s/ Kenneth Rigtrup, Commissioner

Attest:

/s/ Victor N. Gibb, Secretary

APPENDIX I-4

Utah Power and Light Company Estimated Loads, Resources and Margins 1974-86
MW

					Contracts								Margin		Excess
Year	Firm Peak	Load Management[a]	Total	Own Capability	Arizona Huntington	Arizona	Idaho	Montana	Puget	Salt River	Washington	Total Capability	4-1	Percent	Over Need[b]
1973[c]															
W	1,213	0	1,213	1,353	0	100	0	(30)	0	0	(30)	1,393	180	14.8	(2)
1974[c]															
S	1,391	0	1,391	1,768	(100)	0	0	0	0	0	0	1,668	277	19.9	(1)
W	1,228	0	1,228	1,768	(100)	100	0	(100)	0	0	(110)	1,558	330	26.9	84
1975[c]															
S	1,540	0	1,540	1,768	(100)	0	0	0	140	0	60	1,868	328	21.3	20
W	1,328	0	1,328	1,768	(100)	0	0	0	0	100	(60)	1,708	380	28.6	114
1976[c]															
S	1,727	0	1,727	1,768	0	0	0	60	200	0	60	2,088	361	20.9	16
W	1,579	0	1,579	1,768	0	0	0	60	0	100	0	1,928	349	22.1	33
1977[c]															
S	1,824	0	1,824	2,168	0	0	(50)	60	120	0	0	2,298	474	26.0	121
W	1,769	0	1,769	2,168	0	0	(110)	0	0	100	0	2,158	389	22.0	44
1978															
S	2,050	(30)	2,020	2,568	0	0	(270)	0	180	0	0	2,478	458	22.7	69
W	1,973	(20)	1,953	2,568	0	0	(190)	0	0	0	0	2,378	425	21.8	46
1979															
S	2,310	(58)	2,252	2,568	0	0	(130)	0	220	0	0	2,658	406	18.0	(27)
W	2,186	(34)	2,152	2,568	0	0	(110)	0	0	50	0	2,508	356	16.5	(56)
1980															
S	2,451	(85)	2,366	2,968	0	0	(125)	0	0	0	0	2,843	477	20.2	4
W	2,307	(40)	2,267	2,968	0	0	(100)	0	0	0	0	2,868	601	26.5	148
1981															
S	2,588	(112)	2,476	2,968	0	0	0	0	0	0	0	2,968	492	19.9	(3)
W	2,431	(48)	2,383	2,968	0	0	0	0	0	0	0	2,968	585	24.5	108
1982															
S	2,748	(130)	2,618	2,968	0	0	0	0	0	0	0	2,968	350	13.4	(174)
W	2,563	(57)	2,506	2,968	0	0	0	0	0	0	0	2,968	462	18.4	(39)
1983															
S	2,973	(153)	2,820	3,368	0	0	0	0	0	0	0	3,368	548	19.4	(16)
W	2,768	(70)	2,698	3,368	0	0	0	0	0	0	0	3,368	670	24.8	130
1984															
S	3,199	(168)	3,031	3,368	0	0	0	0	0	0	0	3,368	337	11.1	(269)
W	2,973	(75)	2,898	3,368	0	0	0	0	0	0	0	3,368	470	16.2	(110)
1985															
S	3,444	(182)	3,262	3,768	0	0	0	0	0	0	0	3,768	506	15.5	(146)
W	3,195	(81)	3,114	3,768	0	0	0	0	0	0	0	3,768	654	21.0	31
1986															
S	3,709	(200)	3,509	4,268	0	0	0	0	0	0	0	4,268	759	21.6	57
W	3,436	(90)	3,346	4,268	0	0	0	0	0	0	0	4,268	922	27.6	253

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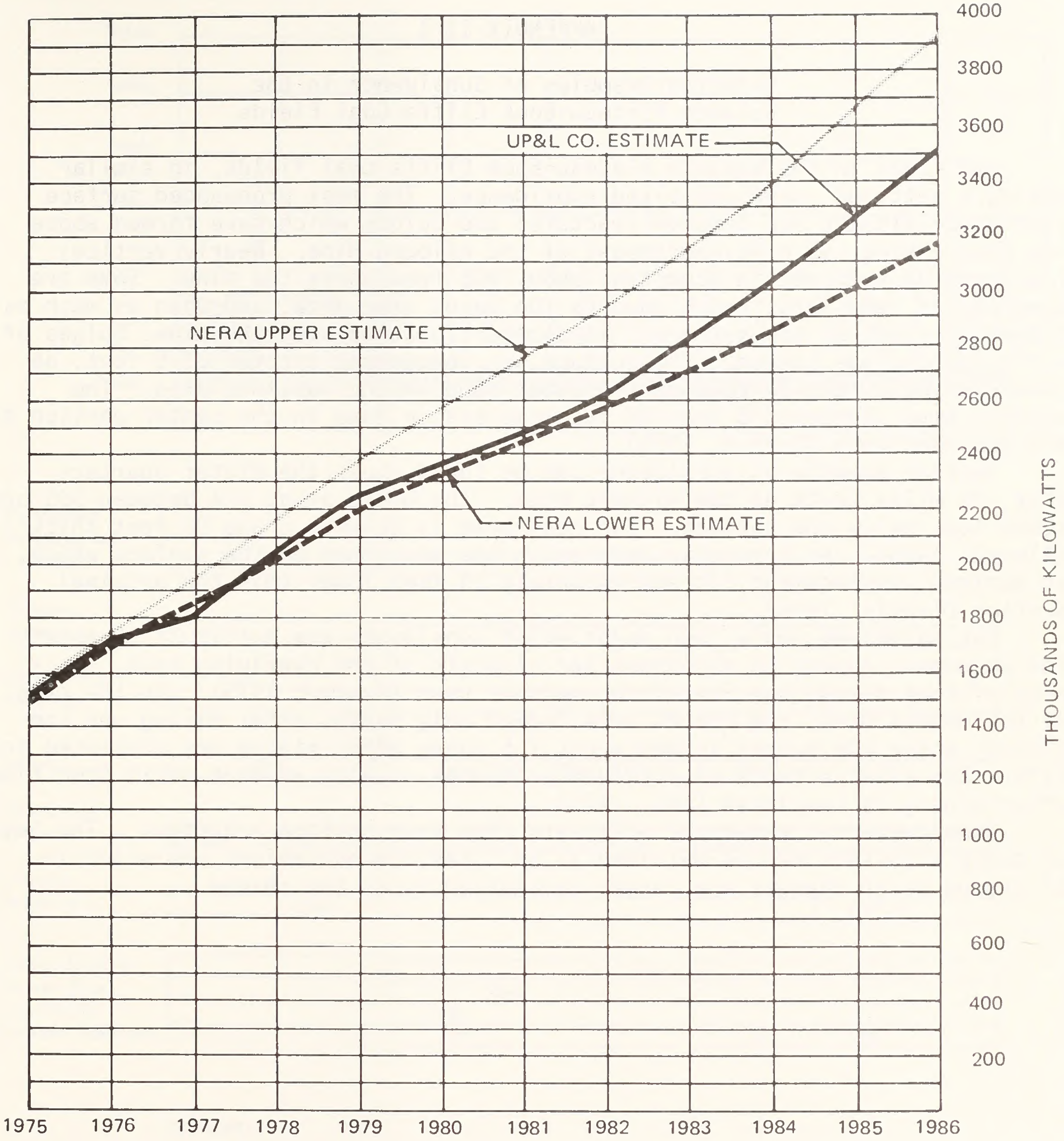
[a] No reserve required for ICPA through 1979.

[b] Current estimate of reduction due to load management.

[c] Actual.



NATIONAL ECONOMIC RESEARCH ASSOCIATES AND UP&L ESTIMATES OF FIRM PEAK LOAD

APPENDIX II-1

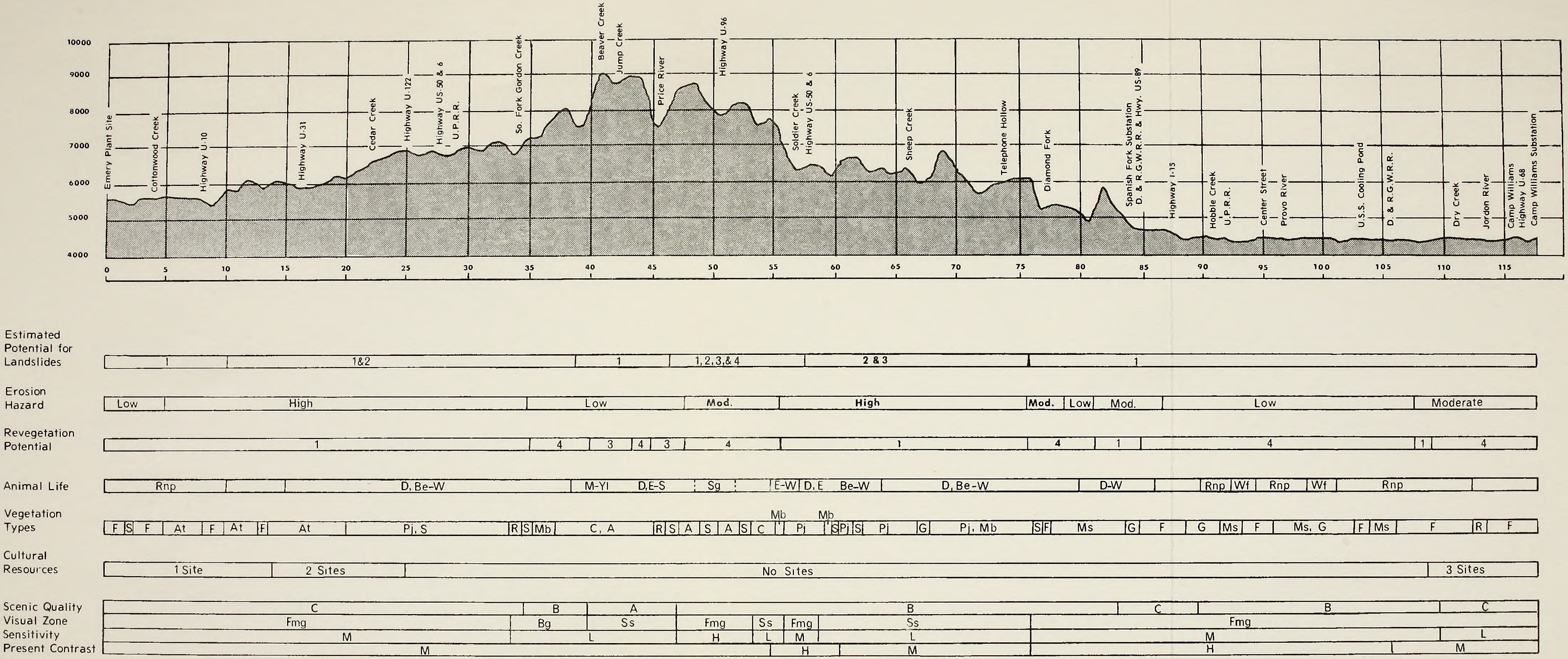
Selected Examples of Subsidence in the Wasatch Plateau-Book Cliffs Coal Fields

Two mines in the Wasatch Plateau-Book Cliffs coal fields, in similar geologic settings, have exhibited subsidence. The most pronounced surface subsidence effects are tension fractures and bulges which have formed above the Geneva Mine, 45 miles northeast of the Wilberg Mine. Nearly vertical fractures have formed in sandstone about 900 feet above the mine. Some are hundreds of feet long, reach down to the caved mine area, and open as much as 3 feet in width at the surface. At another location over the mine, bulges of surface rock have formed. The surface was lengthened a total of 5 feet, as evidenced by a tension zone in the outer edge of the subsided area. The surface also shortened 3 feet in the compression zone in the center portion of the subsided area (Dunrud, 1975).

Another example of subsidence can be found above the Winter Quarters Mine, 25 miles north of the Wilberg Mine. The mined areas are between 500 and 1,000 feet below the surface. The coal seam is between 6 and 20 feet thick (Alvord, 1975). An irregular depression has developed on the surface which, at maximum displacement, is approximately 15 feet lower than the original surface (Travis, 1976).

The magnitude, rate, and duration of subsidence are difficult to assess. The phenomena depend on thickness and strength of the overlying rock, thickness of coal mined, and the mining methods used (Dunrud, 1975). In the case of the Geneva Mine, the cracks were formed only months after mining was completed, while the bulges formed about 1.5 years after mining was completed in 1975. The total effects of subsidence are not usually evident until some time after mining is completed (NAS, 1975).

Subsidence can reduce or eliminate flow from surface acquifers. The loss of these acquifers can be detrimental to livestock operations and wildlife. If ground water changes are large, vegetation types can change.



LEGEND

POTENTIAL FOR LANDSLIDES

1 - Stable.
2 - Moderately unstable, small movement, low landslide risk.
3 - Moderately unstable, evidence of past slides, moderate to high landslide risk.
4 - Unstable recent or continuing extensive land movement, High landslide risk.

REVEGETATION POTENTIAL

1 - < 30 percent
2 - 30 to 50 percent
3 - 50 to 70 percent
4 - > 70 percent

ANIMAL LIFE

Rnp - Ringnecked Pheasant
D - Deer
Be - Bald Eagle
M - Moose
E - Elk
Wf - Waterfowl
Sg - Sagegrouse
Hp - Hungarian Partridge
Upd - Utah Prairie Dog
Ge - Golden Eagle
Pa - Pronghorn Antelope

W - Winter
S - Summer
Yl - Yearlong

VEGETATION

C - Mixed Forest
Mb - Mtn. brush
Pj - Pinyon-Juniper
S - Sagebrush
G - Grassland
Gw - Greasewood
At - Salt bush
R - Riparian
Ms - Marsh
D - Saltgrass
F - Farmland
A - Aspen
An - Annuals

SCENIC RESOURCES

SCENIC QUALITY
A - Class A scenery
B - Class B scenery
C - Class C scenery

VISUAL ZONE
Fmg - Foreground, Middleground
Bg - Background
Ss - Seldom Seen

SENSITIVITY AND PRESENT CONTRAST
H - High
M - Medium
L - Low

ENVIRONMENTAL PROFILE: PROPOSED SPANISH FORK TRANSMISSION LINE

APPENDIX II-2

APPENDIX II-3

Major Plant Communities and Typical Species Occurring in Central Utah

Plant Community	Major Vegetative Species	
Aspen	Quaking aspen	Populus tremuloides
	Tailcup lupine	Lupinus caudatus
	Nodding brome	Bromus anomalus
Greasewood	Greasewood	Sarcobatus vermiculatus
	Saltbush	Atriplex powellii
	Alkali sacaton	Sporobolus airoides
Grassland	Squirreltail grass	Sitanion hystrix
	Sandberg bluegrass	Poa secunda
	Sticky rabbitbrush	Chrysothamnus viscidiflorus
Mixed Conifer	Quaking aspen	Populus tremuloides
	Douglas fir	Pseudotsuga menziesii
	Mountain juniper	Juniperus scopulorum
Mountain Brush	Mountain snowberry	Symphoricarpos oreophilus
	Gambel oak	Quercus gambelii
	Yarrow	Achillea millefolium
Pinyon-Juniper	Gambel oak	Quercus gambelii
	Utah juniper	Juniperus osteosperma
	Pinyon pine	Pinus edulis
Riparian	Fremont poplar	Populus fremontii
	Sandbar willow	Salix exigua
	Kentucky bluegrass	Poa pratensis
Saltbush	Mat saltbush	Atriplex corrugata
	Castle Valley clover	Atriplex cuneata
	Buckwheat	Eriogonum gordonii
Marsh	Saltgrass	Distichlis stricta
	Bulrush	Scirpus spp.
	Cattail	Typha spp.
Sagebrush	Big sagebrush	Artemisia tridentata
	Indian ricegrass	Oryzopsis hymenoides
	Cheatgrass	Bromus tectorum

APPENDIX II-4

Possibly Endangered Plants Which Could Occur in Influence Zone

Family	Species	1975[a]	Lists 1976[b]	Welsh[c]
Apocynaceae (dogbane family)	*Cycladenia jonesii*	X	X	X
Asteraceae (sunflower family)	*Erigeron maguirei*	X	X	X
	Gaillardia flava		X	T
	Lygodesmia grandiflora var. *stricta*		X	X
	Townsendia aprica	X	X	X
Boraginaceae (borage family)	*Cryptantha johnstonii*	X		X
	Cryptantha jonesiana	X		T
Brassicaceae (mustard family)	*Physaria grahamii*	X	X	R
Cactaceae (cactus family)	*Sclerocactus wrightiae*		X	X
Fabaceae (pea family)	*Astragalus desereticus*	X	X	X
	Astragalus iselyi		X	X
	Astragalus loanus	X	X	R
	undescribed *Astragalus*			X
	Astragalus pardalinus	X		R
Liliaceae (lily family)	*Zigadenus vaginatus*		X	T
Poaceae (grass family)	*Festuca dasyclada*	X	X	X
Polygonaceae (buckwheat family)	*Eriogonum corymbosum* var. *davidsei*	X	X	X
	Eriogonum lancifolium	X	X	X
	Eriogonum smithii		X	X

Legend: "T" is recommended to be changed to threatened; "R" is recommended to be removed from both lists (Welsh, 1978).

[a] 40 F.R. 27824-27924

[b] 41 F.R. 24524-24572; no threatened plants on this list.

[c] Endangered and Threatened Plants of Utah--A Re-evaluation (Welsh, 1978).

APPENDIX II-5

Possibly Threatened Plants Which Could Occur in Influence Zone

Family	Species	Lists		
		1975[a]	1976[b]	Welsh[c]
Apiaceae (carrot family)	*Cymopterus coulteri*	X		X
	Cymopterus newberryi	X		R
	Cymopterus rosei	X		R
	Lomatium latilobum	X		R
Asclepiadaceae (milkweed family)	*Asclepias cutleri*	X		X
	Asclepias ruthiae	X		X
Asteraceae (sunflower family)	*Erigeron mancus*	X		X
Caryophyllaceae (pink family)	*Silene petersonii*	X		X
Chenopodiaceae (goosefoot family)	*Atriplex welshii*	X		X
Euphorbiaceae (spurge family)	*Euphorbia nephradenia*	X		X
Fabaceae (pea family)	*Astragalus rafaelensis*	X		X
	Astragalus sabulosus			X
	Lupinus marianus	X		R
	Peteria thomsonae	X		R
Geraniaceae (geranium family)	*Geranium marginale*	X		R
Hydrophyllaceae (waterleaf family)	*Nama retrorsum*	X		R
	Phacelia constancei	X		R
	Phacelia demissa var. *heterotricha*	X		R
	Phacelia howelliana	X		X
	Phacelia rafaelensis	X		R
	Phacelia utahensis	X		X
Loasaceae (loasa family)	*Mentzelia argillacea*			X
Polygonaceae (buckwheat family)	*Eriogonum ostlundii*	X		X
Scrophulariaceae (snapdragon family)	*Castilleja scabrida*	X		R
	Penstemon abietinus	X		R
	Penstemon leiophyllus	X		R
	Penstemon tidestromii			X
	Penstemon wardii	X		X

Legend: R--recommended to be removed from List (Welsh, 1978).

[a] 40 F.R. 27824-27924.

[b] 41 F.R. 24524-24572; no threatened plants on this list.

[c] Endangered and Threatened Plants of Utah--A Re-evaluation (Welsh, 1978).

APPENDIX II-6

Definition of Visual Resource Management Terms

VISUAL ZONES

Foreground-Middleground (FMg)

This is an area that can be seen from travel routes or use areas for a distance of 3 to 5 miles. Management activities can be seen in detail. The outer boundary of this zone is defined as the point where texture and form of individual plants is no longer apparent in the landscape.

Background

This is the remaining area which can be seen, within about 15 miles, from travel routes or use areas. Vegetation can be discerned at least as patterns of light and dark.

Seldom Seen

These are areas that are beyond the background zone or cannot be seen from travel routes or use areas, or can be seen from low use transportation routes only.

SCENIC QUALITY

Class A

Areas in which land form, water form, and vegetative patterns are of unusual or outstanding visual quality.

Class B

Areas in which features contain variety, but are not outstanding. Areas lack dominating features.

Class C

Areas in which features have little variety and become monotonous.

SENSITIVITY LEVELS

High Sensitivity

Public concern for quality of the visual resource is major.

Medium Sensitivity

Public concern for quality of the visual resource is secondary.

Low Sensitivity

Public concern for quality of the visual resource is minor.

(Criteria weighed for determining visual sensitivity includes existing and proposed land uses, use levels, community attitudes, and agency attitudes. VRM assumes that unaltered land has greater scenic value.)

MAGNITUDE OF MAN-MADE CONTRAST

Low

Contrast will not attract attention from the landscape character.

Medium

Contrast attracts attention and begins to dominate landscape character.

High

Contrast demands attention, will not be overlooked, and dominates the landscape character.

APPENDIX II-7

Definitions of Farmlands

Prime Farmlands

Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pastureland, rangeland, forest land, or other land, but not urban built-up land or water). It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. They are permeable to water and air. Prime farmlands are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding. Examples of soils that qualify as prime farmland are Palouse silt loam, 0 to 7 percent slopes; Brookston silty clay loam, drained; and Tama silty clay loam, 0 to 5 percent slopes.

Unique farmland

Unique farmland is land other than prime farmland that is used for the production of specific high value food and fiber crops. It has the special combination of soil quality, location, growing season, and moisture supply needed to economically produce sustained high quality and/or high yields of specific crop when treated and managed according to acceptable farming methods. Examples of such crops are citrus, tree nuts, olives, cranberries, fruit, and vegetables.

Farmland of Statewide Importance

This is land, in addition to prime and unique farmlands, that is of statewide importance for the production of food, feed, fiber, forage, and oilseed crops. Criteria for defining and delineating this land are to be determined by the appropriate state agency or agencies. Generally, additional farmlands of statewide importance include those that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some may produce as high a yield as prime farmlands if conditions are favorable. In some states, additional farmlands of statewide importance may include tracts of land that have been designated for agriculture by state law.

Source: Soil Conservation Service, 1978.

APPENDIX II-8

Wilderness

BLM lands that would be directly affected by proposed and alternate facilities for Units 3 and 4 were inventoried for wilderness values. The Secretary of the Interior granted special approval to complete this inventory in a Memorandum dated July 20, 1978. The inventory was done by a team of two members, provided by BLM's Richfield and Moab District offices.

One roadless area of more than 5,000 acres in Juab County and three influence corridors in Emery County were involved in the study (see Figure 1). An influence corridor was defined for this study as that area where the proposed action, if completed, would become the dominent intrusion in a natural landscape.

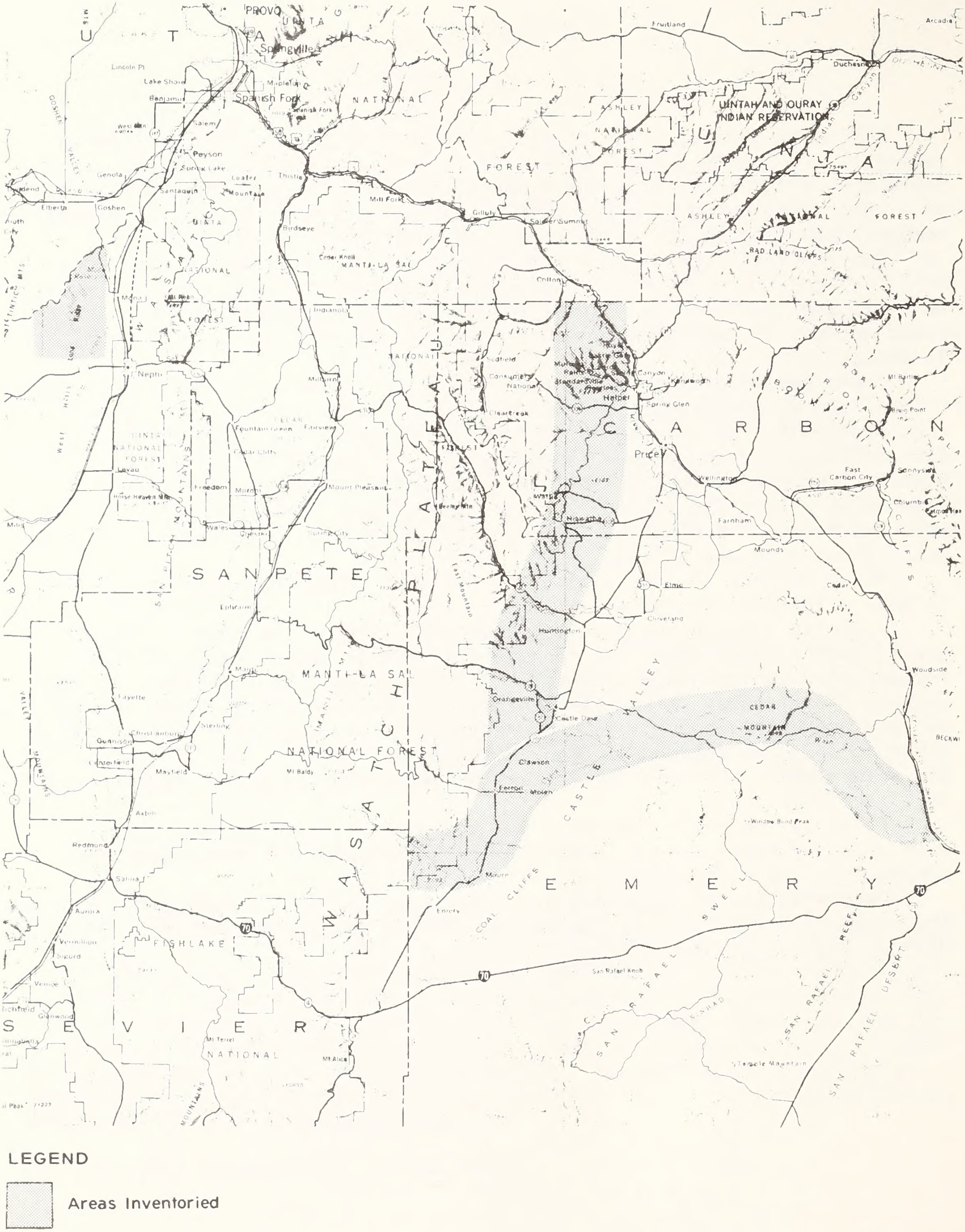
The areas were inventoried for wilderness character as defined in Section 2(c) of the Wilderness Act of 1964 (i.e., containing naturalness and outstanding opportunity for solitude or unconfined recreation). Naturalness was determined by air and ground inventory of types and extent of man-made intrusions. The opportunity for solitude was judged based upon topography and vegetation within the inventory unit. Unconfined recreation opportunities were documented. Ecological, geological, scientific, educational, or historical values were also documented.

Based on lack of naturalness, all three inventoried areas were judged not to have wilderness character.

A public meeting was held September 13, 1978 in the Emery County Courthouse, Castle Dale, Utah. At the meeting, BLM personnel involved in the review reported inventory findings and recommended that the three areas be dropped from further wilderness review. About 25 people attended the meeting. (No environmental groups were represented.) Those present made no comments opposing the BLM recommendations. A thirty day comment period was provided after the public meeting. No letters of opposition to the recommendations were received.

Prior to the public meeting, BLM representatives discussed the review with Juab and Emery County Commissioners. The commissioners stated their support for the recommendations.

Documentation of the wilderness inventory and public comments concerning the review are available at the Bureau of Land Management Richfield District Office, Richfield, Utah 84701.



BLM AREAS INVENTORIED FOR WILDERNESS VALUES

FIGURE 1

APPENDIX III-1

Discussion of Visibility Study by H. E. Cramer

The following assumptions were used in this study:

1. Meteorological range is an objective indicator of visual range.
2. Atmospheric discoloration refers to a yellow or brown haze caused by the selective absorption of blue light by nitrogen dioxide (NO_2).
3. The observer is located at the boundary of each area of special interest and is looking through the plume along a line of sight perpendicular (normal) to the plume axis.
4. Only conditions in which the plume would be contained in the surface mixing layer were used.
5. Minimum and maximum chemical transformation values for sulfur dioxide (SO_2) to sulfates, nitric oxide (NO) to NO_2, and NO_2 to nitrates in plumes from coal-fired power plants in the western United States are applicable.
6. Only visual range during daylight hours is applicable.
7. The atmospheric discoloration calculations using the threshold blue light to red light luminance ratio of 0.9 suggested by Latimer (1978) is applicable.

The case studied did not include other possible conditions when the plume would be contained in an elevated inversion or when the observer might be looking at an angle to the plume or for a line of sight directed downwind along the plume axis. It was recognized that calculated visibility impacts are maximized for the along wind view and further that most of the cases of atmospheric discoloration reported from coal-fired power plants appear to have been associated with plumes contained in an elevated inversion layer above the top of the surface mixing layer. The Cramer Company stated that the uncertainties involved with these conditions were too great for reliable visibility impact calculations to be made.

During a conference on visibility modeling hosted by the Utah State Office of the Bureau of Land Management on March 15, 1978, a working group comprised of representatives of government agencies and private industry recommended that the variability shown by existing visibility measurements be considered in assessing the significance of visibility reductions caused by power plant emissions. The working group also suggested that a significant visibility reduction might be defined as a reduction that equals or exceeds one standard deviation of the measured mean visibility. The Cedar Mountain meteorological range data show, depending on the view and the measurement period, standard deviations of 10 to 20 percent from the mean baseline meteorological range which varies from about 62 to 85 miles. Accepting the working group's suggestions and assuming that the variability of the Cedar Mountain meteorological range data is representative of the existing variability in visibility, reductions of 10 to 20 percent in the baseline meteorological range attributable to power plant emissions are required to produce a visibility impact in an area of interest. In other words, a power plant plume must cause a relative reduction in the baseline meteorlogical range approximately equal to the average relative variability shown by measurements of the meteorlogical range in order to have an impact on the visual range in an area of concern.

APPENDIX III-2

Population Projections
Rationale and Assumptions

The employment and population projections used in this study are a product of 1) projections of external variables (i.e., those variables--such as coal production--which are largely influenced by forces outside the Carbon/Emery area), and 2) an economic/demographic model which linked the internal variables (e.g., employment, population, income, etc.) to the external variables and linked the internal variables to each other. The model produces annual projections of employment, population, income, and population by age and sex. The structure of the model and the coefficients used in the model were tested in terms of how well they performed in simulating the actual 1970-77 period in the Carbon/Emery area. Since the model performed remarkably well during this simulation period and since it is believed that the energy developments in the Carbon/Emery area between 1980 and 1987 will be similar to those which occurred during the 1970-77 period, it is believed that the economic/demographic model, with some minor modifications, should perform "reasonablely" well over the 1980-87 period.

The dominant external variable used in the model is coal production which requires that a forecast of coal production be made for the 1980-87 period. Annual coal production projections used in the Environmental Statement: Development of Coal Resources in Central Utah range from 15 million to 46 million short tons for 1985. For purposes of this study, it was concluded that the analysis should be limited to only two alternative assumptions regarding coal producton. Alternative A (the lower limit) reflects the consultant's opinion--based upon an analysis of existing operations, detailed and preliminary proposals, new leases, and discussions with knowledgeable industry people--that there is only 1 chance in 10 that actual coal production will be less than 15 million short tons in 1985. Alternative B (the upper limit) reflects the consultant's opinion that there is only 1 chance in 10 that actual coal production will be above 21 million short tons in 1985, excluding Units 3 and 4. Hence, the consultant believes that there is only 1 chance in 5 that actual coal production during the 1980-87 period will not be within the range of the two alternatives used in this study.

Additional comments need to be made in this section regarding projections of population by community. First, the economic/demographic model produced projections of total population for the Carbon/Emery area by year, by age, and by sex. Second, these projections of total population were distributed to the communities based upon a number of factors, including:

1. A survey of current construction workers on Emery Units 1 and 2 showing the following residency distribution: Price River Valley, 34 percent; Huntington, 12 percent; Orangeville, 6 percent; Castle Dale, 21 percent; Ferron, 13 percent; Cleveland and unincorporated, 4 percent; outside Carbon and Emery counties, 10 percent.

2. A survey of current miners at the American Coal-Deer Creek Mine showing that 30 percent resided in the Huntington-Cleveland area, 21 percent in the Castle Dale-Orangeville area, 9 percent in the Ferron-Emery area, 35 percent in the Price River Valley, and 5 percent in areas outside of Carbon and Emery counties.

APPENDIX III-2 (concluded)

3. Discussions with local public officials in each community relating to their current capacities, zoning laws, and their plans and actual or proposed programs for accommodating future population growth.

4. The specific location of mines and power plants and the knowledge that employees tend to live in those communities closest to the work place and tend to favor those communities with a larger variety of and a higher quality of services and amenities.

5. A larger proportion of the indirect or secondary employment would be located in the larger communities.

6. The assumption that no "new" towns will be created and that all of the existing communities in Emery County (excluding Green River) and in the Price River Valley will experience significant impacts from future energy developments including the construction and operation of Emery Units 3 and 4.

7. The expectation that over time, as the communities in Castle Valley grow and develop, a larger proportion of the work force in Emery County will find it more attractive to live in Castle Valley and to discontinue commuting from the outlying areas.

APPENDIX VIII-1

Possibly Threatened or Endangered Plant Species

Family	Genus Species	Status
Green River and Wellington Alternatives		
Secondary Influence Zone		
Apiaceae	Cymopterus newberryi	T
Apiaceae	Lomatium latilobum	T*
Apocynaceae	Cycladenia jonesii	E
Asclepiadaceae	Asclepias cutleri	T
Asclepiadaceae	Asclepias ruthiae	T
Asteraceae	Erigeron maguirei	E
Asteraceae	Erigeron mancus	T
Asteraceae	Gaillardia flava	E
Asteraceae	Hymenoxys depressa	T*
Asteraceae	Lygodesmia grandiflora var. stricta	E
Asteraceae	Parthenium ligulatum	E
Boraginaceae	Cryptantha elata	T
Boraginaceae	Cryptantha johnstonii	E
Boraginaceae	Cryptantha jonesiana	E
Brassicaceae	Physaria grahamii	E
Cactaceae	Sclerocactus wrightiae	E
Chenopodiaceae	Atriplex welshii	T*
Euphorbiaceae	Euphorbia nephradenia	T
Fabaceae	Astragalus iselyi	E
Fabaceae	Astragalus pardalinus	E
Fabaceae	Astragalus rafaelensis	T
Fabaceae	Astragalus sabulosus	T*
Fabaceae	Astragalus wetherillii	T
Fabaceae	Peteria thomsonae	T
Hydrophyllaceae	Nama retrorsum	T
Hydrophyllaceae	Phacelia constancei	T
Hydrophyllaceae	Phacelia howelliana	T
Hydrophyllaceae	Phacelia rafaelensis	T
Liliaceae	Zigadenus vaginatus	E
Poaceae	Festuca dasyclada	E
Polygonaceae	Eriogonum corymbosum var. davidsei	E
Polygonaceae	Eriogonum intermontanum	E
Polygonaceae	Eriogonum lancifolium	E
Polygonaceae	Eriogonum smithii	E
Primulaceae	Primula specuicola	T
Scrophulariaceae	Castilleja scabrida	T
Green River Transmission Line Route		
Apocyanaceae	Cycladenia jonesii	E
Asclepiadaceae	Asclepias ruthiae	T
Boraginaceae	Cryptantha johnstonii	E
Fabaceae	Astragalus pardalinus	E
Fabaceae	Astragalus rafaelensis	T

APPENDIX VIII-1 (continued)

Family	Genus Species	Status
Wellington Transmission Line Route		
Asteraceae	Gaillardia flava	E
Polygonaceae	Eriogonum corymbosum var. davidsei	E
Polygonaceae	Eriogonum lancifolium	E
Wellington-Green River Pipeline		
Asteraceae	Gaillardia flava	E
Asteraceae	Lygodesmia grandiflora var. stricta	E
Polygonaceae	Eriogonum corymbosum var. davidsei	E
Polygonaceae	Eriogonum lancifolium	E
Nephi and Delta Alternative		
Plant Site--Secondary Influence Zone		
Apiaceae	Cymopterus basalticus	T
Apiaceae	Cymopterus coulteri	T
Apiaceae	Cymopterus newberryi	T
Asteraceae	Machaeranthera grindelioides var. depressa	T
Boraginaceae	Cryptantha compacta	T
Cactaceae	Sclerocactus pubispinus	T
Cuscutaceae	Cuscuta warneri	E
Fabaceae	Astragalus lentiginosus var. chartaceus	E
Fabaceae	Peteria thomsonae	T
Malvaceae	Sphaeralcea caespitosa	T*
Polygonaceae	Eriogonum ammophilum	E
Polygonaceae	Eriogonum eremicum	T
Polygonaceae	Eriogonum natum	T*
Scrophulariaceae	Penstemon concinnus	E
Scrophulariaceae	Penstemon nanus	E
Scrophulariaceae	Penstemon tidestromii	T*
Nephi Transmission Line Corridor		
Apiaceae	Cymopterus coulteri	T
Delta Plant Site		
Cactaceae	Sclerocactus pubispinus	T

APPENDIX VIII-1 (continued)

Family	Genus Species	Status
Delta Transmission Line Corridor		
Apiaceae	*Cymopterus coulteri*	T
Cactaceae	*Sclerocactus pupispinus*	T
Secondary Influence Zone--Coal Source		
Apiaceae	*Cymopterus higginsii*	T*
Apiaceae	*Cymopterus newberryi*	T
Apiaceae	*Cymopterus rosei*	T
Apiaceae	*Lomatium minimum*	T
Asclepiadaceae	*Asclepias ruthiae*	T
Asteraceae	*Erigeron abajoensis*	T
Asteraceae	*Haplopappus scopulorum*	T
Asteraceae	*Helianthus deserticolus*	T*
Asteraceae	*Hymenopappus filifolius* var *tomentosus*	T
Asteraceae	*Machaeranthera glabriuscula* var. *confertifolia*	T*
Asteraceae	*Townsendia minima*	T*
Boraginaceae	*Cryptantha semiglabra*	T
Brassicaceae	*Draba sobolifera*	T
Brassicaceae	*Draba subalpina*	T
Brassicaceae	*Draba zionensis*	T
Brassicaceae	*Thelypodium sagittatum* var. *ovalifolium*	T*
Cactaceae	*Opuntia whipplei* var. *multigeniculata*	T
Caryophyllaceae	*Silene petersonii* var. *minor*	T*
Euphorbiaceae	*Euphorbia nephradenia*	T
Fabaceae	*Astragalus ampullarius*	T
Fabaceae	*Astragalus convallarius* var. *finitimus*	T
Fabaceae	*Astragalus ensiformis*	T
Fabaceae	*Astragalus henrimontanensis*	T*
Fabaceae	*Astragalus lancearius*	T
Fabaceae	*Astragalus limnocharis*	T*
Fabaceae	*Astragalus monumentalis*	T*
Fabaceae	*Astragalus nidularius*	T
Fabaceae	*Astragalus oophorus* var. *lonchocalyx*	T
Fabaceae	*Lupinus jonesii*	T*
Fabaceae	*Lupinus marianus*	T
Fabaceae	*Peteria thomsonae*	T
Fabaceae	*Psoralea epipsila*	T
Fabaceae	*Psoralea pariensis*	T*
Geraniaceae	*Geranium marginale*	T
Hydrophyllaceae	*Nama retrorsum*	T
Hydrophyllaceae	*Phacelia anelsonii*	T
Hydrophyllaceae	*Phacelia cephalotes*	T
Hydrophyllaceae	*Phacelia constancei*	T

APPENDIX VIII-1 (continued)

Family	Genus Species	Status
Hydrophyllaceae	*Phacelia demissa* var. *heterotricha*	T
Hydrophyllaceae	*Phacelia rafaelensis*	T
Onagraceae	*Camissonia parryi*	T
Onagraceae	*Epilobium nevadense*	T
Polemoniaceae	*Gilia mcvickerae*	T
Polemoniaceae	*Phlox gladiformis*	T
Polemoniaceae	*Phlox jonesii*	T
Polygonaceae	*Eriogonum jamesii* var. *rubicola*	T
Polygonaceae	*Eriogonum ostlundii*	T
Polygonaceae	*Eriogonum panguicense* var. *alpestre*	T
Polygonaceae	*Eriogonum thompsonae* var. *albiflorum*	T
Polygonaceae	*Eriogonum thompsonae* var. *thompsonae*	T
Primulaceae	*Primula specuicola*	T
Scrophulariaceae	*Castilleja parvula* var. *parvula*	T
Scrophulariaceae	*Castilleja scabrida*	T
Scrophulariaceae	*Penstemon abietinus*	T
Scrophulariaceae	*Penstemon atwoodii*	T*
Scrophulariaceae	*Penstemon bracteatus*	T*
Scrophulariaceae	*Penstemon caespitosus* var. *suffruticosus*	T
Scrophulariaceae	*Penstemon humilis* var. *obtusifolius*	T*
Scrophulariaceae	*Penstemon leiophyllus*	T
Scrophulariaceae	*Penstemon parvus*	T
Violaceae	*Viola charlestonensis*	T
Apiaceae	*Cymopterus minimus*	E
Asteraceae	*Erigeron flagellaris* var. *trilobatus*	E
Asteraceae	*Erigeron religiosus*	E
Asteraceae	*Erigeron sionis*	E
Asteraceae	*Heterotheca jonesii*	E*
Asteraceae	*Viguiera soliceps*	E
Boraginaceae	*Cryptantha ochroleuca*	E
Brassicaceae	*Lesquerella rubicundula*	E*
Brassicaceae	*Lesquerella tumulosa*	E*
Cactaceae	*Echinocereus engelmannii* var. *purpureus*	E
Cactaceae	*Sclerocactus wrightiae*	E*
Fabaceae	*Astragalus harrisonii*	E
Fabaceae	*Astragalus lentiginosus* var. *ursinus*	E*
Fabaceae	*Astragalus loanus*	E
Fabaceae	*Astragalus malacoides*	E
Fabaceae	*Astragalus pardalinus*	E
Fabaceae	*Astragalus perianus*	T**
Fabaceae	*Astragalus serpens*	E

APPENDIX VIII-1 (continued)

Family	Genus Species	Status
Fabaceae	*Astragalus striatiflorus*	E*
Hydrophyllaceae	*Phacelia indecora*	E*
Hydrophyllaceae	*Phacelia mammillarensis*	E
Liliaceae	*Zigadenus vaginatus*	E*
Onagraceae	*Camissonia megalantha*	E
Papaveraceae	*Arctomecon humilis*	E
Polygonaceae	*Eriogonum aretioides*	E
Polygonaceae	*Eriogonum corymbosum* var. *matthewsae*	E*
Polygonaceae	*Eriogonum corymbosum* var. *revealianum*	E*
Polygonaceae	*Eriogonum zionis* var *zionis*	E
Ranunculaceae	*Ranunculus acriformis* var. *aestivalis*	E
Scrophulariaceae	*Castilleja aquariensis*	E
Scrophulariaceae	*Castilleja revealii*	E
Coal Haul Railroad		
Apiaceae	*Cymopterus coulteri*[a]	T
Asteraceae	*Townsendia minima*	T*
Boraginaceae	*Cryptantha ochroleuca*	E
Brassicaceae	*Draba subalpina*	T
Brassicaceae	*Lesquerella rubicundula*	E
Caryophyllaceae	*Silene petersonii*	T
Fabaceae	*Astragalus atwoodii*	T*
Fabaceae	*Astragalus barnebyi* (from *A. desperatus* var *conspectus*)	T
Fabaceae	*Astragalus loanus*	E
Fabaceae	*Astragalus malacoides*	E
Fabaceae	*Psoralea pariensis*	T*
Hydrophyllaceae	*Phacelia utahensis*[a]	T
Loasaceae	*Mentzelia argillacea*[a]	T*
Polemoniaceae	*Phlox gladiformis*	T
Polygonaceae	*Eriogonum aretioides*	E
Polygonaceae	*Eriogonum corymbosum* var *revealianum*	E
Polygonaceae	*Eriogonum ostlundii*[a]	T
Scrophulariaceae	*Castilleja revealii*	E
Scrophulariaceae	*Penstemon atwoodii*	T*
Scrophulariaceae	*Penstemon bracteatus*	T*
Scrophulariaceae	*Penstemon leiophyllus*	T
Scrophulariaceae	*Penstemon parvus*	T
Scrophulariaceae	*Penstemon wardii*[a]	T

APPENDIX VIII-1 (concluded)

Family	Genus Species	Status
Soda Springs Alternative		
Secondary Influence Zone		
Asteraceae	Cirsium davisii	T
Boraginaceae	Cryptantha hysophila	T
Boraginaceae	Hackelia hispida	T
Caryophyllaceae	Silena scaposa var lobata	T
Portulacaceae	Claytonia flava	T
Primulaceae	Steironema laevigatum	E

Source: Welsh, 1978 and BLM, 1978.

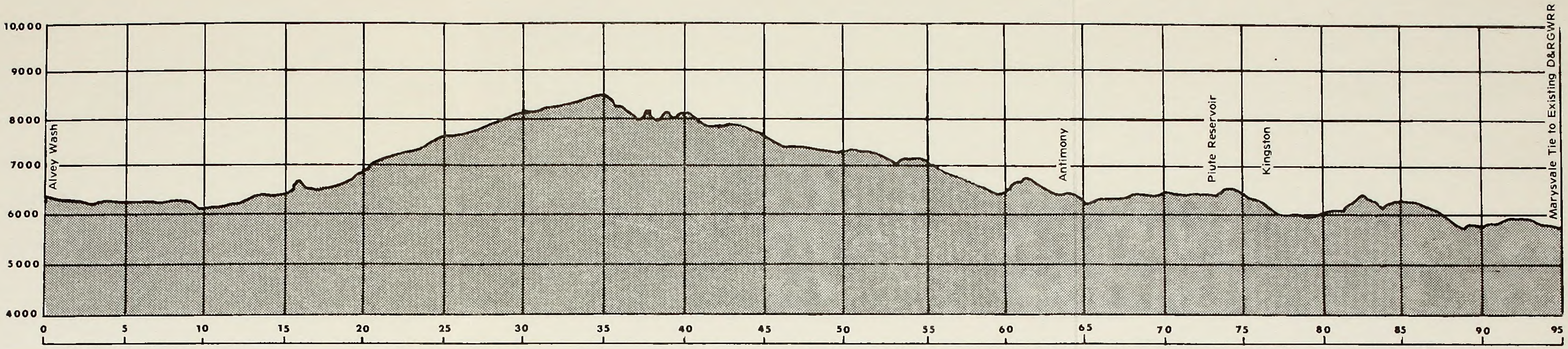
T--Possibly Threatened, 1975 Smithsonian list, 40 F.R. 27824-24924.

E--Possibly Endangered, 1975 and/or 1976 Smithsonian list, 40 F.R. 27824-27924, 41 F.R. 24524-24572.

*Recommended for threatened (T) or endangered (E), S.L. Welsh, 1978b.

**Officialy classified as threatened April 26, 1978, 43 F.R. 17910-17916.

[a] From Sevier Valley; others on list are from the portion of the proposed route south of Marysvale.



Estimated Potential for Landslides	1	2	1									
Erosion Hazard	Low	Moderate	High	Mod.	High	Moderate	Low					
Revegetation Potential	1	2	3	4	3	2	1					
Animal Life	D-W		D-W	D-S	D-W Sg	Be-W, Upd, Ge	D-W, Wf	Wf	D-W Wf	D-W		
Vegetation Types	S	Pj	Gw	Pj	C	Pj	S	Pj	S			
Cultural Resources	12 Sites	3 Sites										
Scenic Quality	B	C	B	C	B	A	B	C	B	C	B	C
Visual Zone	Fmg	Bg	Fmg	Bg	Fmg							
Sensitivity	L	M	H	L	H	M						
Present Contrast	L	M										
BLM Roadless	UT040 075&076	None										

LEGEND

POTENTIAL FOR LANDSLIDES

1 - Stable.
2 - Moderately unstable, small movement, low landslide risk.
3 - Moderately unstable, evidence of past slides, moderate to high landslide risk.
4 - Unstable recent or continuing extensive land movement, High landslide risk.

REVEGETATION POTENTIAL

1 - <30 percent
2 - 30 to 50 percent
3 - 50 to 70 percent
4 - >70 percent

ANIMAL LIFE

Rnp - Ringnecked Pheasant
D - Deer
Be - Bald Eagle
M - Moose
E - Elk
Wf - Waterfowl
Sg - Sagegrouse
Hp - Hungarian Partridge
Upd - Utah Prairie Dog
Ge - Golden Eagle
Pa - Pronghorn Antelope

W - Winter
S - Summer
Yl - Yearlong

VEGETATION

C - Mixed Forest
Mb - Mtn. brush
Pj - Pinyon-Juniper
S - Sagebrush
G - Grassland
Gw - Greasewood
Al - Salt bush
R - Riparian
Ms - Marsh
O - Saltgrass
F - Farmland
A - Aspen
An - Annuals

SCENIC RESOURCES

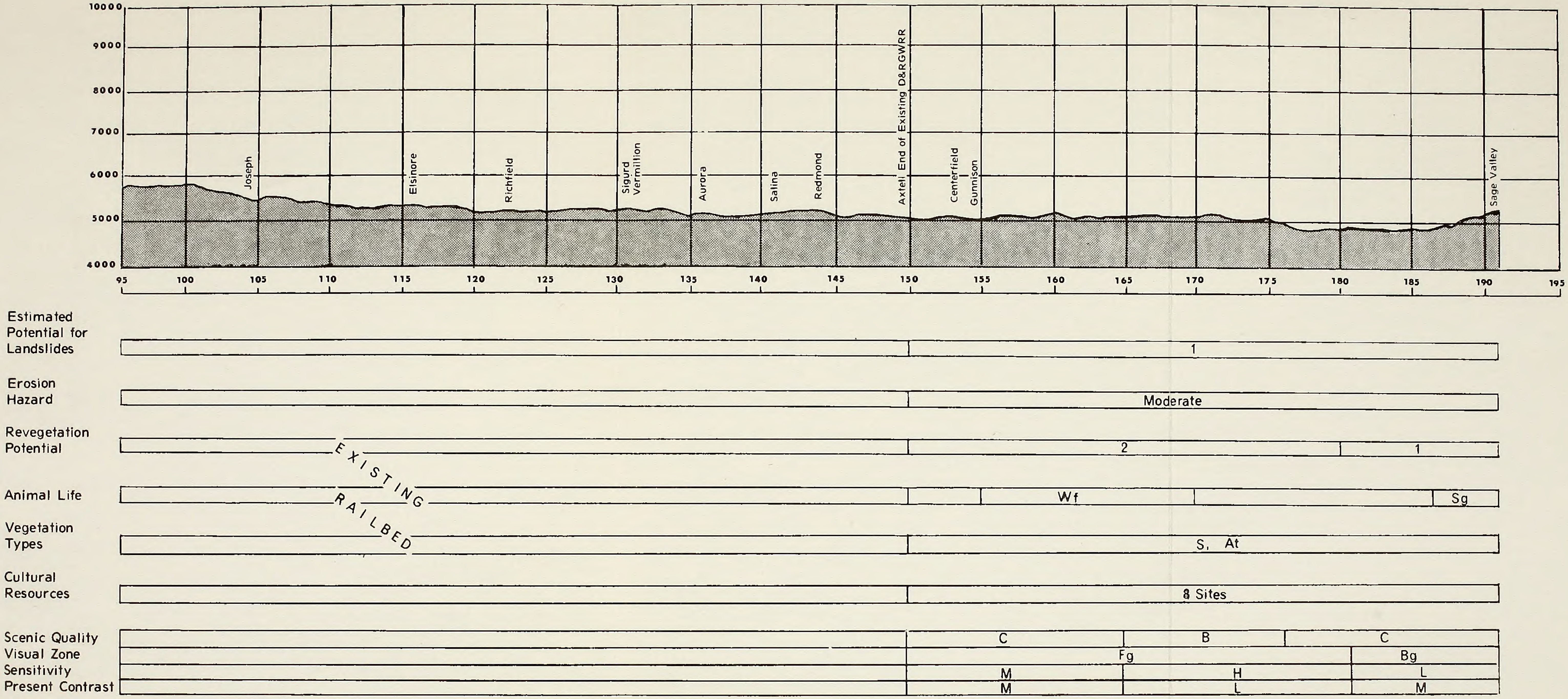
SCENIC QUALITY
A - Class A scenery
B - Class B scenery
C - Class C scenery

VISUAL ZONE
Fmg - Foreground, Middleground
Bg - Background
Ss - Seldom Seen

SENSITIVITY AND PRESENT CONTRAST
H - High
M - Medium
L - Low

NEPHI-DELTA SITES
COAL SUPPLY ROUTE

APPENDIX VIII-2



LEGEND

POTENTIAL FOR LANDSLIDES

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2 - Moderately unstable, small movement, low landslide risk.
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Hp - Hungarian Partridge
Upd - Utah Prairie Dog
Ge - Golden Eagle
Pa - Pronghorn Antelope

W - Winter
S - Summer
Yl - Yearlong

VEGETATION

C - Mixed Forest
Mb - Mtn. brush
Pj - Pinyon-Juniper
S - Sagebrush
G - Grassland
Gw - Greasewood
At - Salt bush
R - Riparian
Ms - Marsh
D - Saltgrass
F - Farmland
A - Aspen
An - Annuals

SCENIC RESOURCES

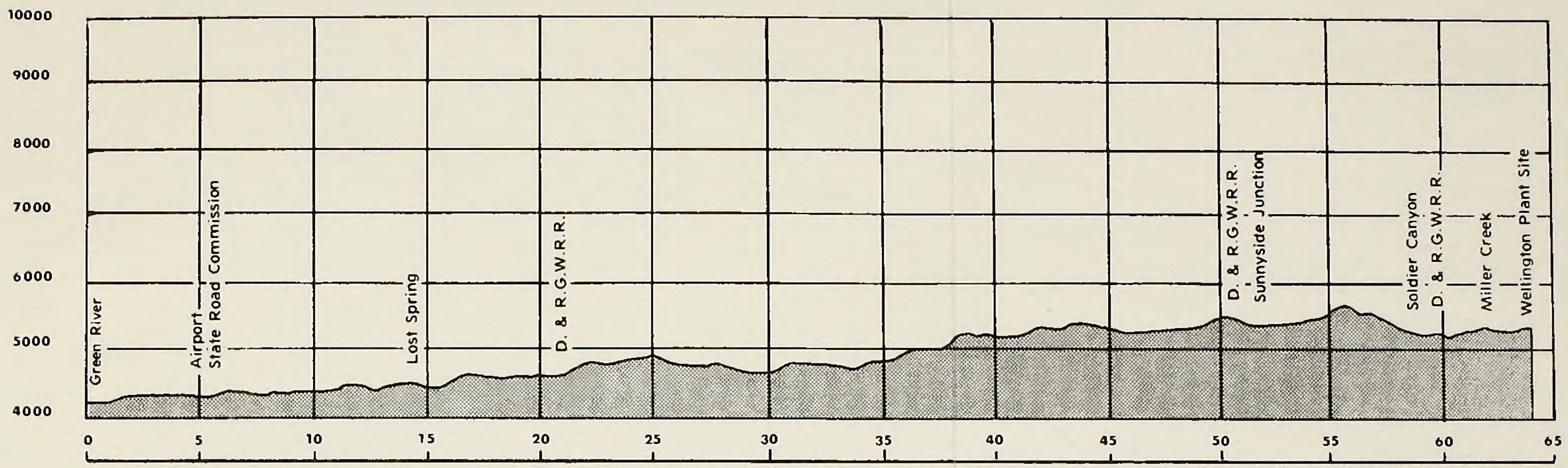
SCENIC QUALITY
A - Class A scenery
B - Class B scenery
C - Class C scenery

VISUAL ZONE
Fmg - Foreground, Middleground
Bg - Background
Ss - Seldom Seen

SENSITIVITY AND PRESENT CONTRAST
H - High
M - Medium
L - Low

DELTA-NEPHI SITES COAL SUPPLY ROUTE (cont.)

APPENDIX VIII-2 (continued)



Estimated Potential for Landslides	1								
Erosion Hazard	High	Moderate							
Revegetation Potential	1								
Animal Life		Pa	Rnp						
Vegetation Types	At	Gw	At	Pj	At	Pj, S	F	At	F
Cultural Resources	None								
Scenic Quality	C								
Visual Zone	Bg	Fmg	Bg	Fmg					
Sensitivity	M								
Present Contrast	L	M							
BLM Roadless	None	UT060 054	None						

LEGEND

POTENTIAL FOR LANDSLIDES

1 - Stable.
2 - Moderately unstable, small movement, low landslide risk.
3 - Moderately unstable, evidence of past slides, moderate to high landslide risk.
4 - Unstable recent or continuing extensive land movement, High landslide risk.

REVEGETATION POTENTIAL

1 - < 30 percent
2 - 30 to 50 percent
3 - 50 to 70 percent
4 - > 70 percent

ANIMAL LIFE

Rnp - Ringnecked Pheasant
D - Deer
Be - Bald Eagle
M - Moose
E - Elk
Wf - Waterfowl
Sg - Sagegrouse
Hp - Hungarian Partridge
Upd - Utah Prairie Dog
Ge - Golden Eagle
Pa - Pronghorn Antelope

W - Winter
S - Summer
Yl - Yearlong

VEGETATION

C - Mixed Forest
Mb - Mtn. brush
Pj - Pinyon-Juniper
S - Sagebrush
G - Grassland
Gw - Greasewood
At - Salt bush
R - Riparian
Ms - Marsh
D - Saltgrass
F - Farmland
A - Aspen
An - Annuals

SCENIC RESOURCES

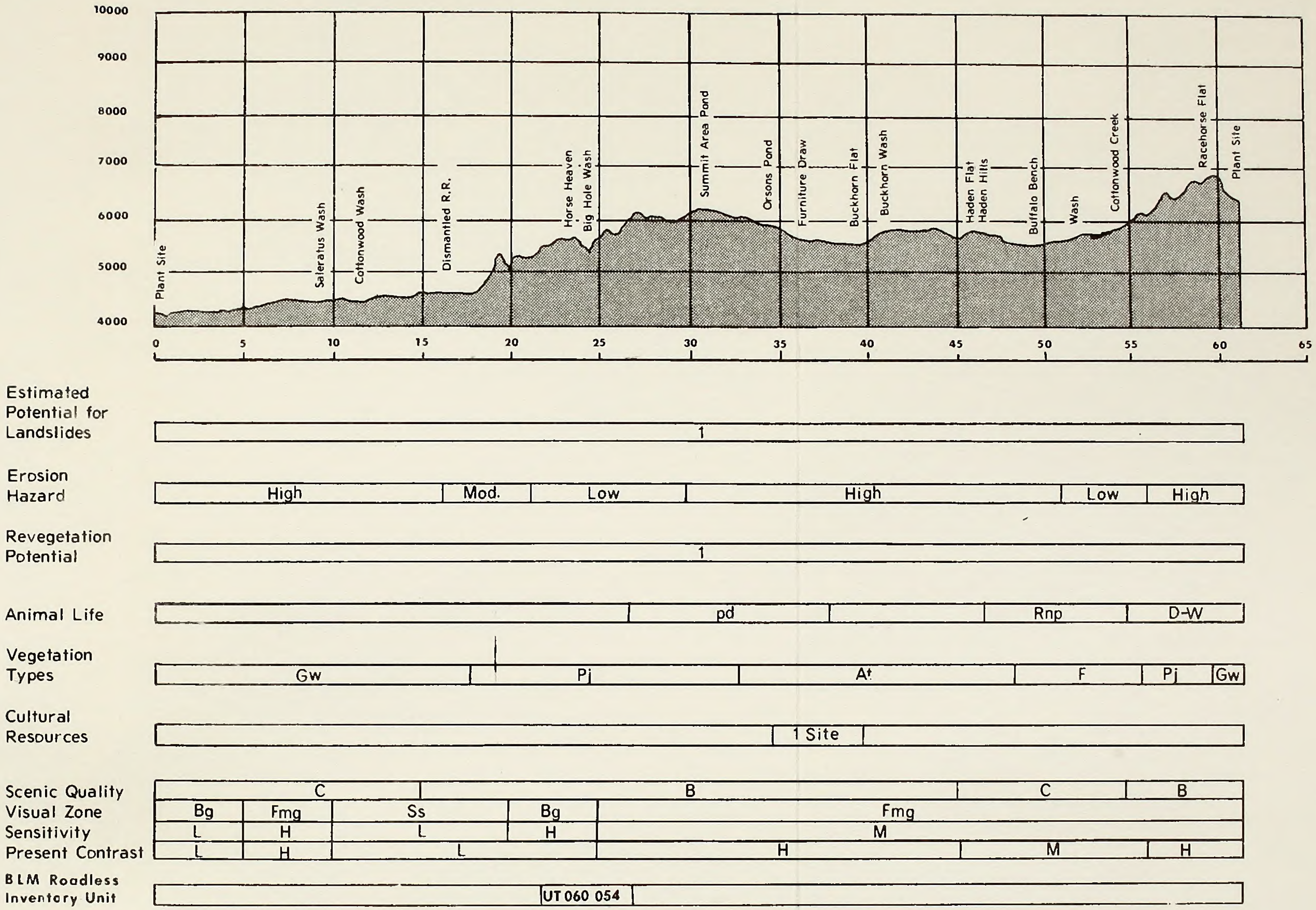
SCENIC QUALITY
A - Class A scenery
B - Class B scenery
C - Class C scenery

VISUAL ZONE
Fmg - Foreground, Middleground
Bg - Background
Ss - Seldom Seen

SENSITIVITY AND PRESENT CONTRAST
H - High
M - Medium
L - Low

WELLINGTON SITE
GREEN RIVER PIPELINE

APPENDIX VIII-3



LEGEND

POTENTIAL FOR LANDSLIDES

1 - Stable.
2 - Moderately unstable, small movement, low landslide risk.
3 - Moderately unstable, evidence of past slides, moderate to high landslide risk.
4 - Unstable recent or continuing extensive land movement, High landslide risk.

REVEGETATION POTENTIAL

1 - <30 percent
2 - 30 to 50 percent
3 - 50 to 70 percent
4 - >70 percent

ANIMAL LIFE

Rnp - Ringnecked Pheasant
D - Deer
Be - Bald Eagle
M - Moose
E - Elk
Wf - Waterfowl
Sg - Sagegrouse
Hp - Hungarian Partridge
pd - Prairie Dog
Ge - Golden Eagle
Pa - Pronghorn Antelope

W - Winter
S - Summer
Yl - Yearlong

VEGETATION

C - Mixed Forest
Mb - Mtn. brush
Pj - Pinyon-Juniper
S - Sagebrush
G - Grassland
Gw - Greasewood
At - Salt bush
R - Riparian
Ms - Marsh
D - Saltgrass
F - Farmland
A - Aspen
An - Annuals

SCENIC RESOURCES

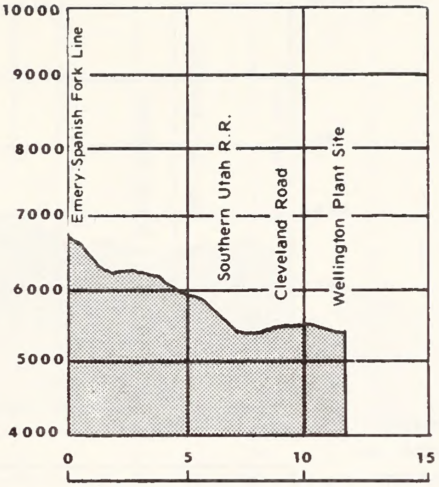
SCENIC QUALITY
A - Class A scenery
B - Class B scenery
C - Class C scenery

VISUAL ZONE
Fmg - Foreground, Middleground
Bg - Background
Ss - Seldom Seen

SENSITIVITY AND PRESENT CONTRAST
H - High
M - Medium
L - Low

GREEN RIVER SITE TRANSMISSION LINE

APPENDIX VIII-4



Estimated Potential for Landslides	1
Erosion Hazard	Moderate
Revegetation Potential	1
Animal Life	Be, D-W Be-W Rnp
Vegetation Types	Pj S Pj, At Gw At F
Cultural Resources	None
Scenic Quality	B C
Visual Zone	Fmg Bg Fmg
Sensitivity	M
Present Contrast	L M

LEGEND

POTENTIAL FOR LANDSLIDES

1 - Stable.
2 - Moderately unstable, small movement, low landslide risk.
3 - Moderately unstable, evidence of past slides, moderate to high landslide risk.
4 - Unstable recent or continuing extensive land movement, High landslide risk.

REVEGETATION POTENTIAL

1 - $<$30 percent
2 - 30 to 50 percent
3 - 50 to 70 percent
4 - $>$70 percent

ANIMAL LIFE

Rnp - Ringnecked Pheasant
D - Deer
Be - Bald Eagle
M - Moose
E - Elk
Wf - Waterfowl
Sg - Sagegrouse
Hp - Hungarian Partridge
Upd - Utah Prairie Dog
Ge - Golden Eagle
Pa - Pronghorn Antelope

W - Winter
S - Summer
Yl - Yearlong

VEGETATION

C - Mixed Forest
Mb - Mtn. brush
Pj - Pinyon-Juniper
S - Sagebrush
G - Grassland
Gw - Greasewood
At - Salt bush
R - Riparian
Ms - Marsh
D - Saltgrass
F - Farmland
A - Aspen
An - Annuals

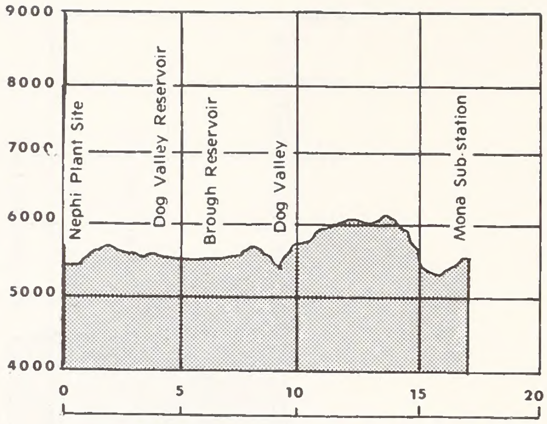
SCENIC RESOURCES

SCENIC QUALITY
A - Class A scenery
B - Class B scenery
C - Class C scenery

VISUAL ZONE
Fmg - Foreground, Middleground
Bg - Background
Ss - Seldom Seen

WELLINGTON SITE TRANSMISSION LINE

APPENDIX VIII-5



Estimated Potential for Landslides	1					
Erosion Hazard	Moderate					
Revegetation Potential	2					
Animal Life	Sg, & E, D-W	Rnp				
Vegetation Types	At	S	F	At	P	F
Cultural Resources	1 Site	None	1			
Scenic Quality	C					
Visual Zone	Bg	Fmg				
Sensitivity	L	M				
Present Contrast	L					

LEGEND

POTENTIAL FOR LANDSLIDES

1 Stable.
2 Moderately unstable, small movement, low landslide risk.
3 Moderately unstable, evidence of past slides, moderate to high landslide risk.
4 Unstable recent or continuing extensive land movement, High landslide risk.

REVEGETATION POTENTIAL

1 - <30 percent
2 - 30 to 50 percent
3 - 50 to 70 percent
4 - >70 percent

ANIMAL LIFE

Rnp - Ringnecked Pheasant
D - Deer
Be - Bald Eagle
M - Moose
E - Elk
Wf - Waterfowl
Sg - Sagegrouse
Hp - Hungarian Partridge
Upd - Utah Prairie Dog
Ge - Golden Eagle
Pa - Pronghorn Antelope

W - Winter
S - Summer
Yl - Yearlong

VEGETATION

C - Mixed Forest
Mb - Mtn. brush
Pj - Pinyon Juniper
S - Sagebrush
G - Grassland
Gw - Greasewood
At - Salt bush
R - Riparian
Ms - Marsh
D - Saltgrass
F - Farmland
A - Aspen
An - Annuals

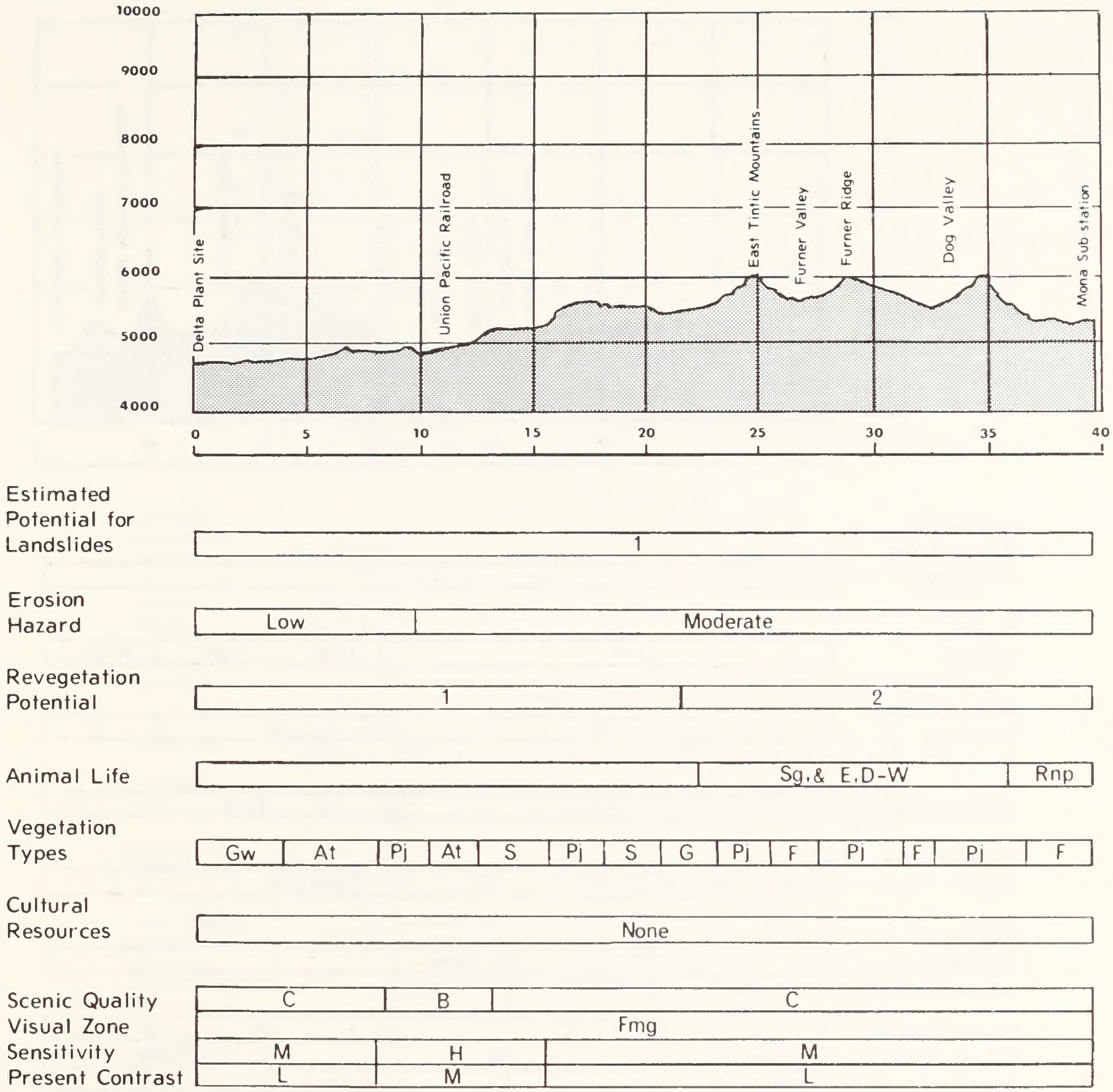
SCENIC RESOURCES

SCENIC QUALITY
A - Class A scenery
B - Class B scenery
C - Class C scenery

VISUAL ZONE
Fmg - Foreground, Middleground
Bg - Background
Ss - Seldom Seen

NEPHI TRANSMISSION LINE

APPENDIX VIII-6



LEGEND

POTENTIAL FOR LANDSLIDES

1 Stable.
2 Moderately unstable, small movement, low landslide risk.
3 Moderately unstable, evidence of past slides, moderate to high landslide risk.
4 Unstable recent or continuing extensive land movement, High landslide risk.

REVEGETATION POTENTIAL

1 <30 percent
2 30 to 50 percent
3 50 to 70 percent
4 >70 percent

ANIMAL LIFE

Rnp	Ringnecked Pheasant
D	Deer
Be	Bald Eagle
M	Moose
E	Elk
Wf	Waterfowl
Sg	Sagegrouse
Hp	Hungarian Partridge
Upd	Utah Prairie Dog
Ge	Golden Eagle
Pa	Pronghorn Antelope
W	Winter
S	Summer
Yl	Yearlong

VEGETATION

C	Mixed Forest
Mb	Mtn. brush
Pj	Pinyon Juniper
S	Sagebrush
G	Grassland
Gw	Greasewood
At	Salt bush
R	Riparian
Ms	Marsh
D	Saltgrass
F	Farmland
A	Aspen
An	Annuals

SCENIC RESOURCES

SCENIC QUALITY

A	Class A scenery
B	Class B scenery
C	Class C scenery

VISUAL ZONE

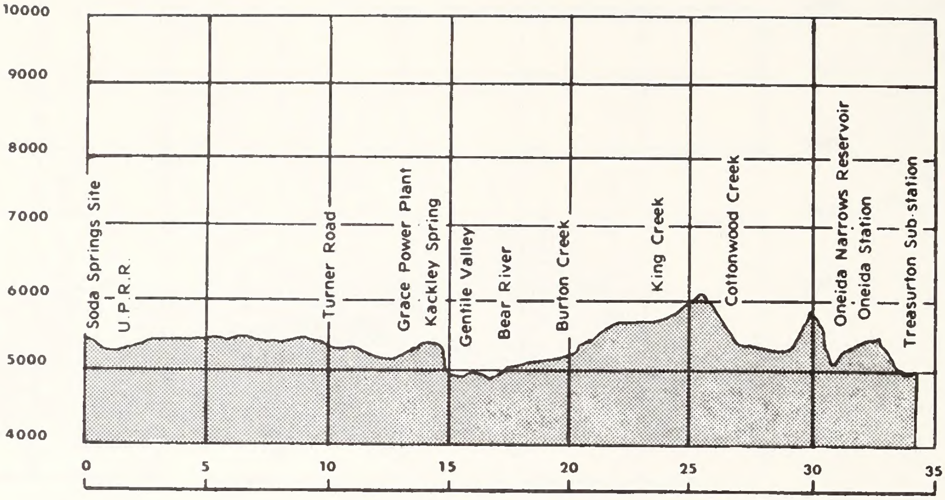
Fmg	Foreground, Middleground
Bg	Background
Ss	Seldom Seen

SENSITIVITY AND PRESENT CONTRAST

H	High
M	Medium
L	Low

DELTA TRANSMISSION LINE

APPENDIX VIII-7



Estimated Potential for Landslides: 1

Erosion Hazard: Low | High | Low | High

Revegetation Potential: 3 | 4 | 3

Animal Life: Hp | | D-W | Hp

Vegetation Types: F | Mb | S | F | Mb, S, A | F | S | F

Cultural Resources: No Sites

Scenic Quality: C | B | A | B

Visual Zone: Fmg | Bg | Fmg

Sensitivity: M | L | H | L

Present Contrast: L | H

LEGEND

POTENTIAL FOR LANDSLIDES

1 · Stable.
2 · Moderately unstable, small movement, low landslide risk.
3 · Moderately unstable, evidence of past slides, moderate to high landslide risk.
4 · Unstable recent or continuing extensive land movement, High landslide risk.

REVEGETATION POTENTIAL

1 · < 30 percent
2 · 30 to 50 percent
3 · 50 to 70 percent
4 · > 70 percent

ANIMAL LIFE

Rnp · Ringnecked Pheasant
D · Deer
Be · Bald Eagle
M · Moose
E · Elk
Wf · Waterfowl
Sg · Sagegrouse
Hp · Hungarian Partridge
Upd · Utah Prairie Dog
Ge · Golden Eagle
Pa · Pronghorn Antelope

W · Winter
S · Summer
Yl · Yearlong

VEGETATION

C · Mixed Forest
Mb · Mtn. brush
Pj · Pinyon-Juniper
S · Sagebrush
G · Grassland
Gw · Greasewood
At · Salt bush
R · Riparian
Ms · Marsh
D · Saltgrass
F · Farmland
A · Aspen
Aη · Annuals

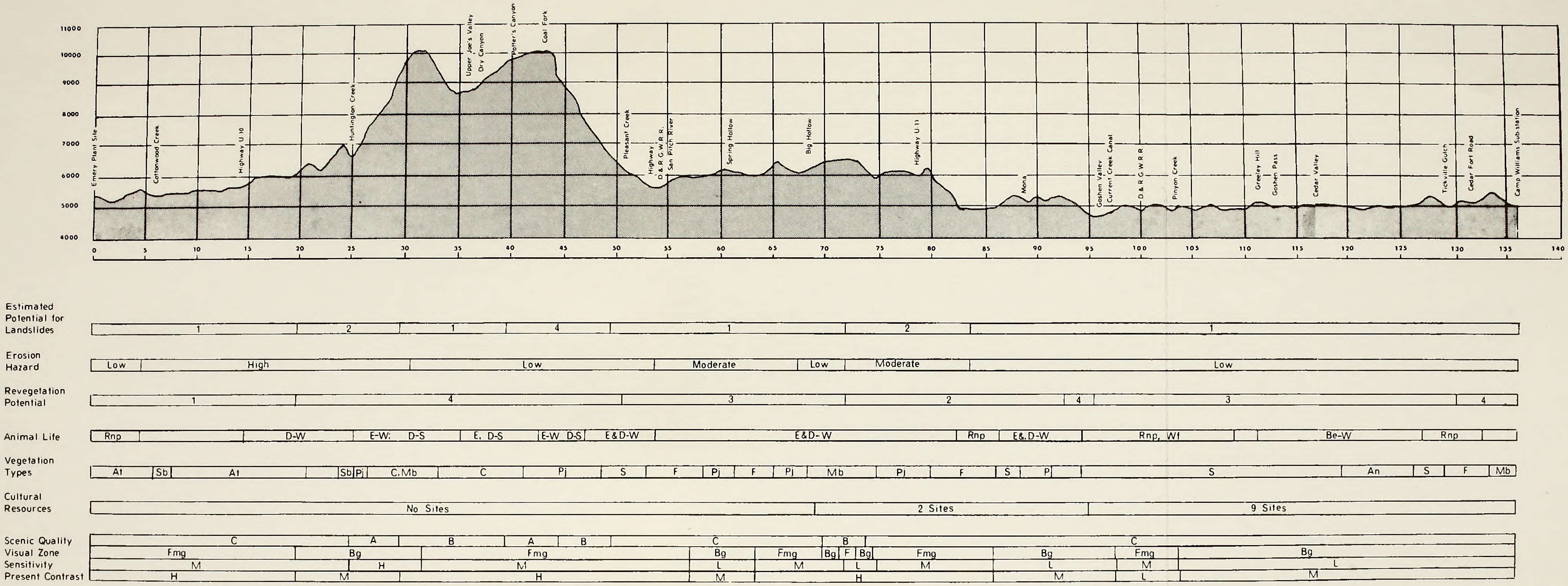
SCENIC RESOURCES

SCENIC QUALITY
A · Class A scenery
B · Class B scenery
C · Class C scenery

VISUAL ZONE
Fmg · Foreground, Middleground
Bg · Background
Ss · Seldom Seen

SODA SPRINGS ALTERNATIVE TRANSMISSION LINE

APPENDIX VIII-8



LEGEND

POTENTIAL FOR LANDSLIDES

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3 · Moderately unstable, evidence of past slides, moderate to high landslide risk.
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REVEGETATION POTENTIAL

1 · 30 percent
2 · 30 to 50 percent
3 · 50 to 70 percent
4 · 70 percent

ANIMAL LIFE

Rnp · Ringnecked Pheasant
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VEGETATION

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SCENIC RESOURCES

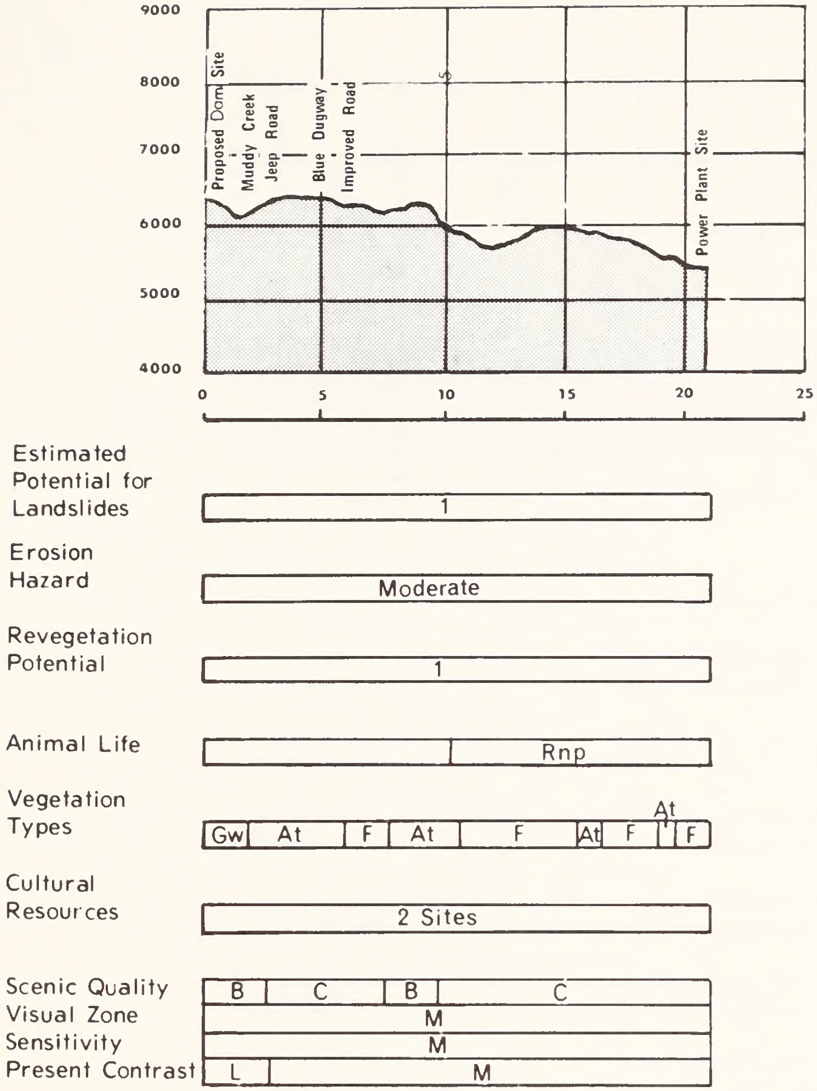
SCENIC QUALITY
A · Class A scenery
B · Class B scenery
C · Class C scenery

VISUAL ZONE
Fmg · Foreground, Middleground
Bg · Background
Ss · Seldom Seen

SENSITIVITY AND PRESENT CONTRAST
H · High
M · Medium
L · Low

MANTI TOP ALTERNATIVE ENVIRONMENTAL PROFILE

APPENDIX VIII-9



LEGEND

POTENTIAL FOR LANDSLIDES

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ANIMAL LIFE

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Ms - Marsh
D - Saltgrass
F - Farmland
A - Aspen
An - Annuals

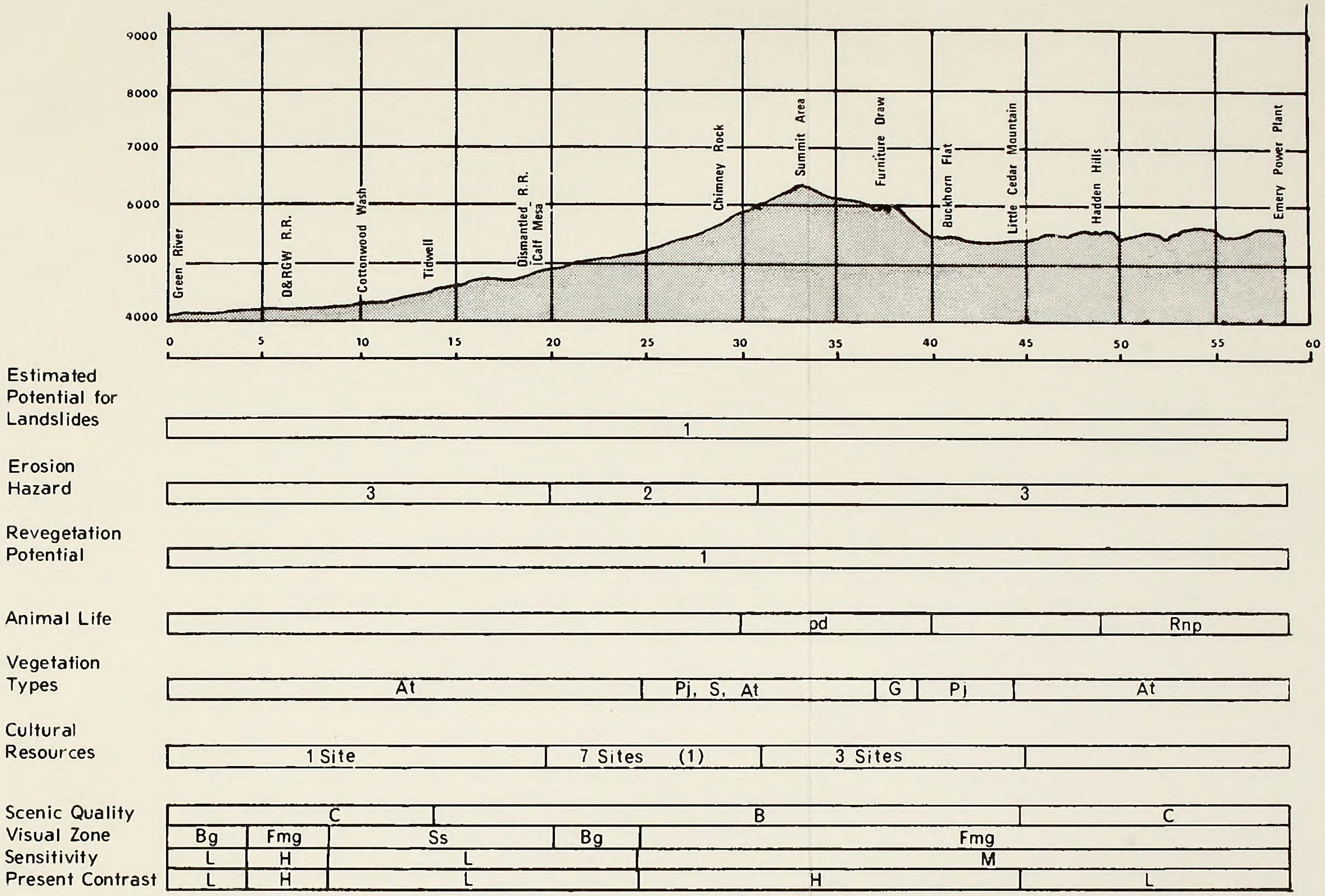
SCENIC RESOURCES

SCENIC QUALITY
A - Class A scenery
B - Class B scenery
C - Class C scenery

VISUAL ZONE
Fmg - Foreground, Middleground
Bg - Background
Ss - Seldom Seen

MUDDY CREEK PIPELINE ALTERNATIVE

APPENDIX VIII-10



LEGEND

POTENTIAL FOR LANDSLIDES

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VEGETATION

C · Mixed Forest
Mb · Mtn. brush
Pj · Pinyon-Juniper
S · Sagebrush
G · Grassland
Gw · Greasewood
At · Salt bush
R · Riparian
Ms · Marsh
D · Saltgrass
F · Farmland
A · Aspen
An · Annuals

SCENIC RESOURCES

SCENIC QUALITY
A · Class A scenery
B · Class B scenery
C · Class C scenery

VISUAL ZONE
Fmg · Foreground, Middleground
Bg · Background
Ss · Seldom Seen

SENSITIVITY AND PRESENT CONTRAST
H · High
M · Medium
L · Low

GREENRIVER WATER PIPELINE

APPENDIX VIII-11

LIST OF ABBREVIATIONS

(General)

a.c.	alternating current
AEC	Atomic Energy Commission
BLM	Bureau of Land Management
CFR	Code of Federal Regulations
d.c.	direct current
DES	draft environmental statement
DRI	Denver Research Institute
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ERDA	Energy Research and Development Administration
ES	Environmental Statement
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FES	Final Environmental Statement
FPC	Federal Power Commission
F.R.	Federal Register
FWPCA	Federal Water Pollution Control Administration
ICPA	Intermountain Consumers Power Association
IPP	Intermountain Power Project
MESA	Mining Enforcement and Safety Administration
MFP	Management Framework Plan (used by Bureau of Land Management)
MRI	Meteorology Research Incorporated
NAAQS	National Ambient Air Quality Standards
NAS	National Academy of Science

LIST OF ABBREVIATIONS (continued)

NAS	National Academy of Science
NAWC	North American Weather Consultants
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NO_2	nitrogen dioxide
NOx	oxides of nitrogen
NRC	Nuclear Regulatory Commission
NSF	National Science Foundation
NSPS	New Source Performance Standards
ORV	off-road vehicle
OSHA	Occupational Safety and Health Administration
P.L.	public law
PSDR	Prevention of Significant Deterioration Regulations
REA	Rural Electrification Administration
R.S.	revised statutes
SCS	Soil Conservation Service
SEUAG	Southeastern Utah Association of Governments
SO_2	sulfur dioxide
SRI	Stanford Research Institute
TDS	total dissolved solids
U.C.A.	Utah Code annotated
UDWR	Utah Division of Wildlife Resources
UP&L	Utah Power and Light Company
USBR	United States Bureau of Reclamation
U.S.C.	United States Code

LIST OF ABBREVIATIONS (continued)

USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USFS	United States Forest Service
USGS	United States Geological Survey
VTN	Voorheis, Trindle, and Nelson (a firm of engineers, architects and planners)

LIST OF ABBREVIATIONS

(Units of Measure)

AUM	animal unit month
Btu	British thermal unit
F	Fahrenheit
ft^3/s	cubic feet per second
gal/d	gallons per day
gal/min	gallons per minute
dB	decibel
dBa	weighted (or adjusted) decibel
km	kilometer
kV	kilovolt
mi	mile
m/s	meters per second
MW	megawatt
p/m	parts per million
lb/in^2	pounds per square inch
t/d	tons per day
UTM	Universal Transverse Mercator
$\mu g/m^3$	micrograms per cubic meter
µm	micrometer

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